

# COMPUTERWORLD

## Compaq price cuts hit mark

BY RICHARD PASTORE  
CW STAFF

HOUSTON — In cutting personal computer prices by up to 34% last week, Compaq Computer Corp. all but abandoned its long-standing premium pricing philosophy. Whether a price war will ensue remains to be seen,

but many users are already captivated by this dramatic about-face.

"I've never seen anything like this from a manufacturer before," said Stephen Rood, microcomputer technology manager at Coopers & Lybrand in New York.

Analysts said Compaq's pre-

mium pricing strategy is gone for the time being, a victim of increased competition, the commodity nature of the PC market and economic problems in the U.S. "With this pricing, Compaq is saying 'We're not special; we're a clone,'" said Joe McGlone, president of research investment firm McGlone & Co. in Westport, Conn.

Compaq's new pricing policy has one clear objective: to increase North American market share, said Ross Cooley, vice-president of Compaq North America. Compaq's future products will fall in line with the new pricing formula, he said.

Compaq's domestic market share has stagnated and declined slightly during recent months.

*Continued on page 8*



**AT&T's Safari laptop weighs in this week at 7 pounds, 2 ounces with an IBM VGA-compatible screen, a full-size keyboard and Microsoft Corp.'s Windows 3.0. Story, page 105**

## NCR bids to smooth imaging integration

BY JOHANNA AMBROSIO  
CW STAFF

NEW YORK — NCR Corp. threw its hat into the imaging ring last week, emphasizing low cost, modular design and the ability of its Document Management System to be easily adapted to existing paper-based systems.

Although DMS has not yet been installed in customer sites,

potential users were intrigued by the promise that it would work within traditional data processing environments, and analysts were impressed by its work-flow management software. This icon-based software allows users to track a specific document within the system and who has worked with it.

Another differentiating factor, analysts noted, is the proprietary character-recognition

software that works with a variety of scanners. Later this year, NCR executives said, DMS will be able to interpret hand-printed numeric characters.

Based on NCR's System 3000 family of Unix processors, DMS allows users to convert paper to electronic form, store and process the images and distribute them throughout an organization. The system supports

*Continued on page 104*

## Battered banks reappraising value of their IS investments

BY CLINTON WILDER  
and JOHANNA AMBROSIO  
CW STAFF

The information systems function of most large commercial banks in the 1980s was like a BMW: It was fashionable to spend a lot of money on it. In the recessionary 1990s, however, banking IS is a lot more like a sensible Honda.

From Boston to Miami to San Francisco, U.S. banks are struggling with the sins of their past in the loan business and in IS. After a 1990 fourth quarter that saw combined profits of the nation's top 54 banks tumble 90%, technology spending is being scrutinized as never before.

Banks are currently squeezing cost savings by consolidating data centers and deferring appli-

cations development.

"We're living in a new era now," said M. Arthur Gillis, president of banking IS consultancy Computer-Based Solu-

tions, Inc. in New Orleans. "If you want to buy new technology, you damn well better bring your business case to the table."

If the sluggish economy was not enough to put more pressure on banking IS, banks are also facing unprecedented challenges from competitors outside the banking industry.

### Visible competition

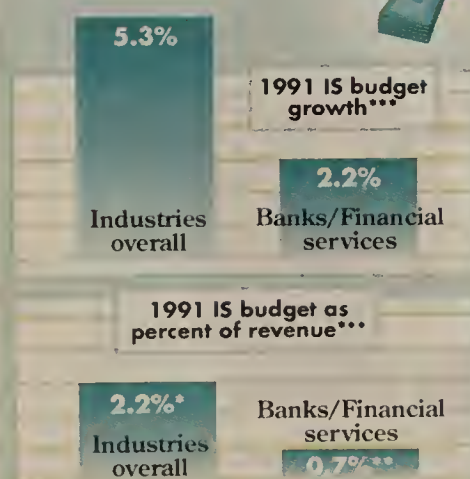
The AT&T Universal card and the Sears, Roebuck and Co. Discover card are the most visible examples of this new competition, which will increase as legislators further deregulate the financial services industry.

Even while watching IS expenses with a much keener eye,

*Continued on page 103*

### Underperforming?

Spending on IS by financial institutions is growing slower than other industries



\*Excluding banks/financial services  
\*\*IS budget as % of assets  
\*\*\*Projected

Source: Index Group, Inc.

CW Chart: Marie Haines

## Overhauled AS/400s to cross mainframe line

BY MARYFRAN JOHNSON  
CW STAFF

A radically revamped line of IBM Application System/400s makes its debut today, topped off by a dual-processor machine equal in power to a low-end 3090 mainframe.

As a major reconstruction of the midrange systems first introduced in 1988, the AS/400 D models will replace every system in the current line and run an entirely new version of the OS/400 operating system. Performance boosts of 30% to 50% are expected, with prices so aggressive that in some cases, they may match or just slightly exceed the cost of current systems, according to users and analysts familiar with IBM's plans.

IBM is also expected to unveil the first piece of its Systemview network management capabilities for the AS/400 platform, with a product called SAA Systemview System Manager 400. It will allow users to distribute program fixes automatically to remote locations and will be of most interest to customers with large networks of AS/400s.

The addition of Systemview — introduced in September 1990 as part of IBM's Systems Application Architecture — will

### In with the new

The popularity of IBM's Application System/400 continues to increase as use of the older System/36 and System/38 declines

U.S. installed base

	IBM System/36 System/38	IBM AS/400
1/89	121,760	11,200
7/89	119,657	20,650
1/90	118,000	26,100
7/90	114,600	32,000
1/91	112,855	37,550

Source: Computer Intelligence

eventually give AS/400 users new abilities in monitoring and managing remote machines from the corporate data center.

"Systemview will be important to us because we have such a mixed environment — everything from two 3090 mainframes on SAA to distributed AS/400s to Novell networks," said Mike Hansen, director of

*Continued on page 10*

## INSIDE

### CASE satisfaction

How would you rate your satisfaction with the product and vendor you use?

See Buyers' Scorecard page 72

Product	Score*
Texas Instruments, Inc.'s IEF	8.2
CGI Systems, Inc.'s Pachbase	7.5
Knowledgeware, Inc.'s IEW/ADW	7.2
Arthur Andersen & Co.'s Foundation	6.6

\*Scores are based on 1-to-10 ratings where 10 is very satisfied.

CW Chart: Doreen St. John

**OS/2 redux:** Price cuts and promises anchor IBM's renewed bid to offset the move to Windows. Page 6.

**Apple to reel Windows 3.0** into lawsuit. Page 4.



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*"Apple has been hurt in the marketplace, so they're becoming more combative in the courtroom."*

JIM POYNER  
WILLIAM K. WOODRUFF

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# EXECUTIVE BRIEFING

■ The slumping banking industry is placing unprecedented demands on IS to do more with less. Even while cutting costs — sometimes through data center consolidations and outsourcing — banks are asking IS to play a key role in competing against non-traditional players such as **AT&T** and **Sears**. New systems must show a business benefit; banks' long romance with technology for its own sake is over. **Pages 1 and 103.**

■ **Compaq slashes personal computer prices** by up to 34%, apparently in response to slower sales in this year of cost-conscious IS. The cuts may not prompt a price war response by other PC makers, but they could signal the end of Compaq's role as the premium clone manufacturer. **Page 1.**

■ **Apple plans to target Microsoft's Windows 3.0** in an expansion of its 1988 lawsuit against Microsoft and HP. Apple says it considers the release to be a derivative product from the original Windows 2.03. Users expecting a drawn-out courtroom battle say they do not plan to shy away from Windows in the meantime. **Page 4.**

■ **Proliferation of laptop computers** is posing a dilemma for IS management. Many firms are placing laptop management in the hands of end users but making sure they don't lose control, as happened with PCs in the 1980s. **Page 55.**

■ **Microsoft and DEC post encouraging first-quarter results**, brightening the computer industry gloom and doom. Microsoft appears especially well positioned as 'the most powerful company in the industry,' in the words of one analyst. **Page 4.**

■ **Southwestern Bell tabs company veteran Ghyrane Davidson** as its new head of IS. He replaces Kenneth Bender, who recently retired from the St. Louis-based regional holding company. **Page 55.**

■ **The burgeoning market for imaging** adds **NCR** to its lineup of vendors. At first glance, **NCR's** Document Management System earns high marks from users for functionality and price/performance. **Page 1.**

■ **AT&T is still balking** at the \$110-per-share takeover price demanded by **NCR**, but recent jumps in **AT&T's** stock prices are fueling speculation that it may bid higher for **NCR**. Meanwhile, **NCR** shareholder vote tallies this

week are expected to oust company Chairman Charles E. Exley Jr. from the board. **Page 105.**

■ **Signet Bank in Richmond, Va., plans to outsource** its IS operations to **EDS**. A deal is expected to be signed May 1. **Page 58.**

■ **Disaster recovery planning** and fault-tolerant systems have IS breathing easier at the Federal Reserve Bank in New York. The bank moved quickly to put its plan in place after its funds transfer system crashed twice in two days in 1987. **Page 31.**

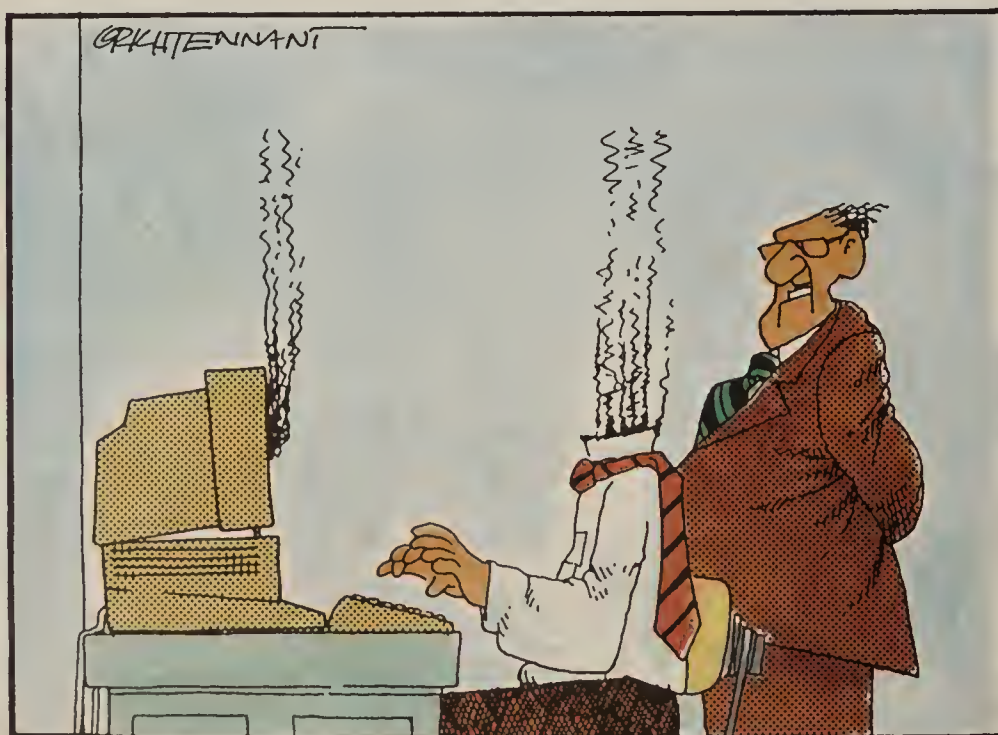
■ **Computerworld Smithsonian Award winner Personics** files for Chapter 11 protection. The developer of a system for making custom audiocassettes in music stores ran up against record companies concerned about royalty issues. **Page 16.**

■ **The ideal CASE environment** does not yet exist, but there are two approaches that come close: single-vendor tool suites and frameworks that integrate tools from other vendors. **Page 61.**

■ **Object-oriented technology** operates under different principles than those of traditional software development. Its object focus enables code reuse and ease of maintenance, helping companies get out from under a development legacy of tangled applications. **Page 79.**

■ **Checking employee references** is an integral part of the IS hiring process, but it comes with its own set of problems. It is a time-consuming task that can brush up against legal privacy issues. **Page 88.**

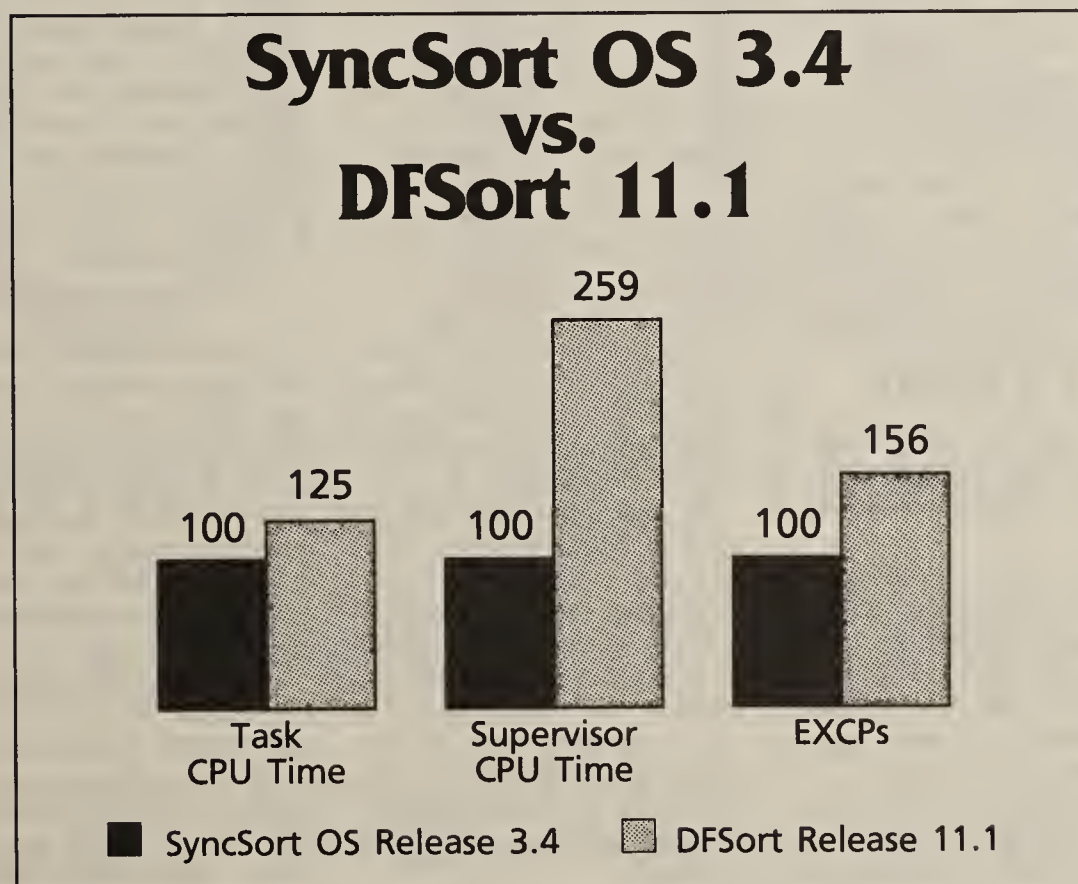
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# Spring profits bringing upbeat outlook

BY NELL MARGOLIS  
CW STAFF

Industry observers saw a grim spring ahead for the computer industry after IBM said last month it would not meet profit expectations. But stellar financial results posted by Microsoft Corp. and encouraging signs from Digital Equipment Corp. last week produced a distinctly more upbeat forecast.

Analysts reading between the lines of last week's earnings reports predicted power shifts and price wars — a bonanza for users — in the low-end market and a reemergence of strength at the high end.

Redmond, Wash.-based Microsoft's 65% profit leap over last year's third quarter surpassed Wall Street's most optimistic expectations. The company said it made \$123.8 million in profits on revenue of \$486.9 million, up 57% from one year earlier, for its fiscal third quarter ended March 31.

Regarding the Microsoft situation, analyst David Bayer at

Montgomery Securities said, "Users are clamoring for graphical user interfaces on desktop platforms."

Marc Schulman, an analyst at UBS Securities, Inc., said he sees Microsoft as more than a mere bellwether. "If power is measured by the ability to set [other companies'] agendas, then Microsoft, despite its relatively modest size, is now the most powerful company in the computer industry," he said.

However, Charlotte Walker, an analyst at Labe, Simpson, Inc., said IBM's renewed OS/2 push (see story page 6) will aim a formidable competitor at Microsoft's popular Windows 3.0 and MS-DOS. "While this won't be a death knell for Windows, we certainly could see a dampening of enthusiasm," she said.

An OS/2 comeback campaign, according to Walker, could help software firms with products

well-positioned on OS/2 — for instance, Lotus Development Corp., Borland International, Inc. and, somewhat ironically, Microsoft.

Lotus reported a first-quarter

ster its unexpectedly sagging sales and goaded by Compaq Computer Corp.'s price cuts (see story page 1), IBM is widely expected to announce personal computer hardware price cuts of its own, Bayer said.

DEC reported an 8% increase in revenue to \$3.5 billion for the third quarter, with profits increasing 368% to \$116.6 million. Both numbers reflect the consolidation of DEC's recently acquired 65% stake in German technology firm Mannesmann AG.

DEC's software and service revenue was strong enough to fuel an overall revenue increase, despite an 8% to 10% drop in hardware sales. DEC's nonhardware sales are growing at 16% annually, said Montgomery Securities analyst John B. Jones Jr. Moreover, "for the first time in recent history, expenses grew more slowly at DEC than revenues," he added.

## The Midas touch

Microsoft Corp.'s growth continues at an intense pace

Quarter	Revenue (in millions)	Profits (in millions)
Q3 '90	\$310.9	\$75.2
Q4 '90	\$337.0	\$80.0
Q1 '91	\$369.4	\$87.6
Q2 '91	\$460.5	\$112.9
Q3 '91	\$486.9	\$123.8

CW Chart: Janell Genovese

profit of \$7 million, down 71% from \$23 million one year earlier, with revenue climbing 5% to \$174 million. The company cited the steep development and marketing costs of expanding its product range.

The battle is not only on the software side. Struggling to bol-

# Apple looks to include Windows 3.0 in lawsuit

BY JAMES DALY  
CW STAFF

REDMOND, Wash. — Apple Computer, Inc. is preparing to turn its legal guns on Microsoft Corp.'s Windows 3.0 by including the best-selling interface in a broadened version of its copyright infringement lawsuit against Microsoft and Hewlett-Packard Co., Microsoft officials said last week.

Although supplemental complaint papers have yet to be filed, William Neukom, Microsoft's vice president for law and corporate affairs, said Apple general counsel Edward Stead told him Apple will seek to widen the scope of the suit to include Windows 3.0. Apple sued Microsoft

and HP in March 1988, claiming that the overlapping windows and icon manipulation screen features in Windows 2.03 and HP's New Wave, which is based on Windows, violated Apple copyrights.

While Neukom called the potential additions "curious," Apple spokesman Christopher Escher said the lawsuit "was brought against Windows 2.03 and all derivative works, and we've always believed that Windows 3.0 was a derivative work."

Last month, Apple won a round in the courtroom drama when U.S. District Court Judge Vaughn Walker rejected Microsoft's contention that the visual elements in dispute were part of

a 1985 cross-licensing agreement with Apple. The ruling cleared the way for the case to go to trial, which is expected in the next few months.

Several analysts said the runaway success of Windows, which has sold more than 3 million copies since its release last May, has come at the expense of Macintosh sales. "Apple has been hurt in the marketplace, so they're becoming more combative in the courtroom," said Jim Poyner, an analyst at William K. Woodruff & Co., a research firm in Dallas.

## Potential threat

If Apple prevails, it could squeeze large royalty payments out of Microsoft or even halt sales of the current version of Windows 3.0, spurring Microsoft engineers to rewrite major portions of the application.

Legal experts noted, however, that an addendum to the charges may not be permitted.

"At this late stage in the game, such an amendment is far from a sure thing," said Ronald Abramson, an intellectual property lawyer at legal firm Hughes Hubbard & Reed in New York. He added that changes would likely be allowed only if they did not introduce major new legal or factual issues to the case.

The potential ramifications of the lawsuit have made it the most closely watched litigation in the personal computer industry, but users said the battle has not affected their acquisition plans. "These courtroom dramas take so long that until I see a ruling saying Microsoft is going to recall Windows, I'm not worried," said Robert McPhee, a senior engineer in the imaging system department at Du Pont Co.

Observers noted that the case could drag on for years. A final court ruling could be one year or more away, and a lengthy appeals process is likely to follow, Abramson said.

## CORRECTIONS

A story headlined "IRS accuses Fujitsu units of tax fraud" [CW, April 1] contained several inaccuracies that resulted from translation problems and a misunderstanding between a reporter and a Fujitsu Ltd. spokesman. The story incorrectly stated that the Internal Revenue Service had accused two U.S. subsidiaries of Fujitsu of tax evasion and had imposed penalty charges against them. In fact, the IRS has not alleged any willful misconduct by the Fujitsu

subsidiaries nor has it imposed penalties beyond back tax liability and interest charges.

The story was based on a newswire report distributed in both Japanese and English by the Nikkei News Service in Japan. The Nikkei reports apparently differed in the language they used to refer to the IRS filings, with the English-language version specifically citing allegations of tax evasion and imposition of penalty charges. An IDG News Service reporter confirmed the Nikkei story with a Fujitsu spokesman. However,

the spokesman later said he confirmed only the Japanese version of the story, which did not mention any IRS allegations of misconduct.

The Sematech technology consortium is still very much alive. Our April 15 editorial incorrectly stated otherwise. U.S. Memories was the consortium that went out of business last year.

A headline in last week's News Shorts column [CW, April 15] incorrectly implied that Compaq Computer Corp. would not at-

tend Comdex/Fall '91. As the item indicated, the company will dispense with its floor booth but will maintain its meeting room space for press conferences and vendor demonstrations.

RDI Computer Corp. is located in San Diego, not in Dallas, as was previously reported. The firm produces Softmac 1.0, software that emulates Apple Computer, Inc.'s Macintosh operating system on workstations using Sun Microsystems, Inc.'s Scalable Processor Architecture.

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# Stability key to OS/2 users

BY PATRICIA KEEFE  
CW STAFF

NEW YORK — A funny thing happened on the way to the IBM OS/2 forums last week. While IBM stressed 32-bit-enabled functionality and dramatic pricing options, enthusiastic users cited the promise of a stable environment capable of supporting key business applications.

"The issue isn't price or 32-bit capability," said George Oliver, manager of information delivery technology at the Toronto-based Royal Bank of Canada. "It's a quality thing pitched against all the hassles with Windows."

"Windows isn't stable," agreed Bill Zack, a consultant at Leveraged Technology, Inc. in New York. If one Windows application goes down, the whole system crashes, he said. Data integrity built into OS/2 Version 2.0 will protect both the operating system and other applications from crashing neighbors. That capability was demonstrated last week.

"Windows is a stable product," protested Steve Ballmer, Microsoft Corp.'s senior vice

president of system software. "Like any other product, over time, people will find bugs."

OS/2 has better memory protection than Windows does, but Microsoft will address this in some release after Windows 3.1



**IBM's Reising:** IBM learned its lesson from having to fix two quality problems with OS/2 1.3

ships, he said.

Ballmer also cautioned IBM. "I want OS/2 2.0 to be great, but it will need time to really get beta-tested and used," he said. "I hope IBM doesn't rush 2.0."

Microsoft need not worry, said Lee Reising, IBM assistant general manager of program

ming. He said IBM learned its lesson from the "terrible trauma" of having to correct previous OS/2 quality problems with the IBM-built OS/2 Version 1.3

Users and consultants who attended daylong briefings on IBM's desktop strategy were mostly enthusiastic about the star of the show — OS/2 2.0, slated to ship late this year.

IBM stressed that users will be able to run their desktop software investment, including Windows 3.0, unmodified under an attractively priced, 32-bit system.

But the bottom line for accounts such as the Royal Bank is that they can finally port mission-critical applications to "a true, architected" operating system, Oliver said. "OS/2 2.0 is everything OS/2 1.0 should have been from the start," said John Dunkle, a consultant at Workgroup Technologies, Inc. in Hampton, N.H.

The ability to run Extended Edition on non-IBM hardware opens the door to cost savings at OS/2 accounts previously hesitant to buy clones.

It could also hurt IBM hardware sales at the same time it

works to bolster OS/2 acceptance, said John McCarthy, a consultant at Forrester Research, Inc. in Cambridge, Mass. "This really opens up Fortune 1,000 accounts to clone makers," he said. But IBM Vice President James Cannavino predicted, "From '90 through '91,

we will, at minimum, hold market share."

Besides demonstrating 16-bit DOS and Windows applications running under OS/2 Version 2.0 at speeds faster than possible in their native environments, IBM announced aggressive price cuts.

## Operation OS/2

**G**oaded into action by anxious users and skeptical developers, IBM went on the OS/2 offensive last week, unveiling a multipart strategy for recapturing the desktop mind-set.

The strategy to boost acceptance of the operating system includes the following:

- Cutting the cost of OS/2 Version 1.3 Standard Edition from \$340 to \$150 and OS/2 1.3 Extended Edition from \$830 to \$690. IBM DOS users can upgrade to OS/2 1.3 for \$99 and to Extended Edition for \$635.
- A free upgrade to OS/2 Version 2.0 for customers who buy either OS/2 1.3 Standard or Extended Editions between April 17 and Dec. 31.
- The promise of running Windows software under OS/2.
- Announced support for OS/2 2.0 and the unbundled Extended Edition components from hardware vendors Compaq Computer Corp., Olivetti Systems & Networks and Tandy Corp.
- Pledges to port applications to OS/2 2.0 from Hewlett-Packard Co., SAS Institute, Inc., Bachman Information Systems, Inc., Intelligent Environments, Inc., Knowledgeware, Inc., Corel Systems Corp., Describe, Inc., Ventura Software, Inc., Metaphor Computer Systems, Inc. and others.

PATRICIA KEEFE

# HP first to put RISC factor in X terminals

BY J. A. SAVAGE  
CW STAFF

Last week, Hewlett-Packard Co. became the first major vendor to offer reduced instruction set computing (RISC)-based X terminals, according to analysts.

The nascent X terminal market, which Eileen O'Brien, an analyst at International Data Corp., estimated at only 64,000 units worldwide last year, is primarily complex instruction set computing-based. Basing the terminals on an embedded RISC processor increases power and is likely to become the norm for the market, analysts said.

An X terminal offloads display processing from a central processor, which runs applications. HP's X terminals are supported through its Unix-based worksta-

tions or other workstations through Transmission Control Protocol/Internet Protocol or Telnet protocols.

HP's terminals, called the HP 700/RX family, use Intel Corp.'s I960 embedded RISC processor.

"An HP processor would be overkill in this situation," an HP spokesman said. Analysts said that an X terminal coming from IBM will also use the I960. Earlier X terminals from HP used Motorola, Inc.'s 34010 chip.

The X terminals range from \$2,995 for a Model 19MI monochrome station, which the company claims has a speed of 60,000 Xstones, to \$5,995 for a Model 19CA with a color monitor and a performance rating of 75,000 Xstones. An Xstone is an indication of the speed at which X commands are executed.

# IBM taps HP's Openview for Unix strategy

BY ELISABETH HORWITT  
CW STAFF

NEW YORK — IBM has announced plans to use pieces of Hewlett-Packard Co.'s Openview technology to fill a yawning gap in its Unix network management strategy.

IBM has licensed portions of the Openview technology from HP and is planning to implement them on an AIX-RISC System/6000 network management platform, although no time frame was offered for a specific product. The platform will initially manage AIX and some HP-UX workstations, said Bill Warner, IBM's director of network management.

IBM will base its Openview system on its Systems Application Architecture data structure and user interface, according to Warner.

This will provide consistency and easier integration between the Unix system and other IBM management platforms, such as Netview and the OS/2 Extended LAN Network Manager, Warner added.

## Unix connection

IBM's Openview product plans mesh with the needs of companies that combine a strong IBM host installation with a growing base of distributed Unix systems, said Don Czubeck, president of Gen2 Ventures, a re-

search firm in Saratoga, Calif. "Some departments don't have any IBM hosts at all, and IBM doesn't want to be left out," he added. In addition, Unix-based systems are more suitable for the emerging generation of distributed, graphics-based network management applications, Czubeck said.

One likely customer of IBM's Openview system is Deere & Co. The company uses Netview to manage its Systems Network Architecture host network but has searched in vain for an effective platform to manage its Transmission Control Protocol/Internet Protocol worldwide network of Unix workstations, said Tom Hein, the firm's manager of technical support.

Providing integrated management has become crucial to Deere since it became dependent on Unix-based production applications that are distributed to factory sites, Hein said. "We have applications that run on both environments that have to work together," he added.

Still in question, however, is whether IBM will expand the Openview product's role beyond the departmental local-area network niche to the management of enterprisewide networks, Ernst & Young partner David Passmore said.

Warner left open the possibility that the Openview-based system could be used as an enter-

prise management system. Its scope would be limited only by the RS/6000's capacity, he added. However, IBM is far from determining the system's ultimate role, Warner said. It will act as an element manager that can feed Unix LAN management data and alerts to IBM's central Systemview and Netview platforms, he added.

## The road to Openview

IBM became acquainted with Openview while working with HP on the two companies' joint submission of a Distributed Management Environment (DME) proposal to the Open Software Foundation (OSF), Warner said.

"It was a natural next step to look at Openview when we were looking at AIX network management," Warner added.

IBM will be pressured to grant its system full status as an enterprise management system if Openview becomes an official part of the OSF's DME architecture, Passmore said.

IBM will want to gain access to the broadening user and vendor base support that the system will garner as an official standard, he added.

Both IBM and HP have pledged to support DME, whether or not their technology is chosen by the OSF. However, IBM will find it harder to support the OSF platform if it is not based on Openview, Warner said.

## X marks the spot

X terminals are carving out a noticeable share of the terminals market

Percent of U.S. Shipments

Year	Low-end terminals	High-end terminals	X terminals	Total shipment (in millions)
1989	58.0%	41.7%	0.3%	2.70
1990	57.8%	41.6%	0.6%	2.85
1991*	58.6%	39.1%	2.3%	2.97
1992*	59.7%	36.4%	3.9%	3.01
1993*	60.8%	32.9%	6.3%	3.02

\*Projected

Source: Market Intelligence Research Corp.

CW Chart: Janell Genovese



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# NEWS SHORTS

## HP plans gallium arsenide chips

Hewlett-Packard Co.'s mainframe-class computer, slated to be out this time next year, is expected to incorporate gallium arsenide chip technology. The eight-processor reduced instruction set computing machine "will not necessarily be more powerful than IBM's mainframes, but it will be up there," said Richard Sevcik, general manager of HP's Commercial Systems Division. Being developed in conjunction with Hitachi Ltd., the computer will have four to five times the speed of current HP machines with a 1G byte/sec. I/O bus, according to Sevcik.

## Multiuser CASE tool offered

McDonnell Douglas Information Systems International announced a multiuser version of its Prokit Workbench system for computer-aided software engineering (CASE) last week. The company, a division of McDonnell Douglas Corp., said Prokit Workbench Multiuser gives better project control and enables a software development team working on a network to use a common, integrated repository to improve performance and first-time software quality.

## Panel probes FTS-2000

A congressional panel last week lambasted management of the federal government's huge communications contract, charging that the agency overseeing carriers AT&T and U.S. Sprint Communications Co. had wasted millions of taxpayer dollars by steering too much business to Sprint, the higher cost provider. John Conyers Jr. (D-Mich.), chairman of the House Government Operations Committee, also charged that the U.S. General Services Administration (GSA) caved in to Sprint's protest at the GSA's attempts to recover some \$6 million to \$11 million in alleged overcharges.

## Micrografx signs up for OS/2

Joining the OS/2 development team is Richardson, Texas-based Micrografx, Inc., which inked a long-term joint development pact with IBM last week. Micrografx will assist IBM in boosting the speed and performance of the OS/2 Presentation Manager graphics engine. Using an "advanced" version of its Mirrors technology, it will also develop migration tools for porting Windows 3.0 applications and device drivers to OS/2 Version 2.0. In addition, Micrografx will develop a Presentation Manager device driver development kit and will provide device drivers for a new Adobe Systems, Inc. Postscript, matrix film recorder and other drivers for OS/2 Presentation Manager.

## Computer dealers merge

The latest example of computer dealer consolidation has claimed Inacomp Computer Centers, Inc. and Valcom, Inc. The two firms announced a merger last week that should be finalized this summer. Both companies' directors and their stockholders will have roughly a 50-50 stake in the new firm, to be called Inacom Corp. The announcement closely follows the recent purchase agreement between Computerland Corp. and Nynex Business Centers and perpetuates a consolidation trend among major personal computer resellers.

## Tandem plans PBX link

Tandem Computers, Inc. is expected today to announce a software product designed to directly connect its hosts to AT&T and Northern Telecom, Inc. private branch exchange (PBX) systems. Scheduled for release in the third quarter, Tandem Call Applications Manager was designed to support call-center applications such as customer service, order entry, reservations and telemarketing. For example, a customer's caller identification number can be used to access the customer's file on a Tandem host and send it to the terminal of the service representative that is picking up the call. The initial software release, slated for the third quarter, will support Northern Telecom's Meridian 1 and SL-1 as well as AT&T's Definity Generic 1 and Generic 2 and System 85 PBXs.

*More news shorts on page 104*

# Do Compaq's price actions spell war?

## ANALYSIS

BY RICHARD PASTORE  
and MICHAEL FITZGERALD  
CW STAFF

Compaq's dramatic personal computer price cuts last week herald a pricing battle to come, many analysts and users said. Others reasoned that because of the niche strength of major clone vendors, the war may not be that bloody.

Clone makers have largely traded in on their ability to dramatically undercut the prices of first-tier players such as Compaq and IBM. Therefore, some observers predicted the cloners will be compelled to drop prices in response to Compaq's maneuvering and cuts IBM is expected to announce midyear.

If second-tier vendors do not continue offering large price differentials, users may see little advantage in buying their wares instead of Compaq's. "Any rational person would probably prefer a Compaq over anything else at that price just because the machinery runs so well," said Stephen Anderson, an information systems architect for the state of Washington. He spoke personally and not for the state.

"Dell Computer Corp. and PC Brand, Inc. will have to price accordingly, or they'll go out of business," predicted Compaq customer Andrei Chivvis, first vice president at Financial Guar-

anty Insurance Co. in New York.

It will be a tough pill to swallow, for some of the low-price PC vendors, however, which have less price flexibility. In January, for instance, Compaq enjoyed a 44% profit margin on its PCs. Everex Systems, Inc.'s margin was 26%, and Zeos International, Inc.'s was 19%, according to Ladenburg, Thalmann & Co.

The industry is also anticipating price drops because of this week's introduction of lower

carving their own market niches and establishing credibility, which could shield them from some of the pressures to cut.

"Dell, Advanced Logic Research and others have built credibility for their distribution strategies and their PC product families," said Tom Willmott, vice president at Aberdeen Group in Boston.

Most clone vendors shrugged off the price cuts. "This puts them more in line with IBM than

## Gravitational pull

*Compaq Computer Corp.'s price cuts pull its product lineup into closer alignment with competitors*

MODEL	PRICE
Dell Computer Corp. System 320LX*	\$3,199
Compaq Deskpro 386S/20 Model 120	\$3,299
AST Research, Inc. Premium Exec 386SX/20	\$3,795
Compaq LTE 386S/20	\$4,799
NEC Technologies, Inc. Powermate 286/12	\$1,949
Compaq Deskpro 286N	\$1,799
Advanced Logic Research, Inc. Powercache 33/4E	\$14,499
Compaq Deskpro 486/33L	\$12,799

\*Products are comparable but not identically configured

CW Chart: Doreen St. John

cost I486 chips from Intel Corp. To position their product lines for these arrivals, vendors may be forced to cut prices on high-end Intel 80386-based boxes.

The most well established clone companies may not have to cut as deeply as less-established ones, some analysts said. Compaq's competitors have been

with us," said Graham Beachum Jr., vice president and general manager at Tandon North America Corp.

"We're real happy with it. We thought it would be a lot more," said Kimball Brown, an Everex spokesman. "At the dealer level, it's only 5% or 10% less, so it's not a big deal."

## Price cuts

FROM PAGE 1

Meanwhile, rivals NEC Technologies, Inc., Dell Computer Corp., Toshiba America Systems, Inc. and others have grown their domestic shares significantly, according to Storeboard/Computer Intelligence.

Early user reaction indicates Compaq may succeed in its goal. "If they provide [a] product to me at a very competitive price, they'll move me away from AST," said Mitchell Weiss, a partner at New York accounting firm Buchbinder Tunick & Co.

Weiss is a Compaq customer who recently strayed to AST Research, Inc. for some desktop purchases.

## The heat is on

At the Baltimore Federal Reserve Bank, pressure has been mounting on information systems departments to buy cheaper clones. The new pricing will relieve that pressure, said Michael Ball, data processing coordinator at the bank.

The cuts could also boost order volumes from Compaq users.

"They'll pick up some business here; it will help us buy more equipment from them,"

Rood predicted.

Compaq dealers are already seeing positive customer reaction. Corporations with outstanding bids have quickly settled on Compaq after hearing of the cuts, said Ed Michelson, co-owner of a Computerland Corp. outlet in San Diego. "It made the clone competition go away."

Compaq's price shift comes none too soon, observers said. Because the disparity in pricing was "almost embarrassing," Compaq's status with major corporate clients was growing "tense," said Matt Fitzsimmons, owner of a Computerland dealership in White Plains, N.Y.

In addition to market factors, Cooley attributed the timing of the change to the economy, market slowdown, rising competition and the fact that Compaq's manufacturing infrastructure is now capable of handling higher volume production.

Observers cautioned that the discounts in list price will not likely transfer dollar for dollar to street prices.

Compaq has passed some of the profit margin squeeze off onto its dealers, which will receive lower vendor discounts. With margins tight already, "no dealer in his right mind will slash his street price the same per-

centage as Compaq slashed their retail price," Michelson said.

Many observers predicted a price war. "This foreshadows some very bloody days to come in the PC market," said Ben Rose, a senior analyst at Technology Investment Strategies Corp. in Framingham, Mass.

Rose and others said they expect IBM to be the slowest to respond because it is insulated by its more diverse product line.

## Is it a big deal?

Executives at AST and Northgate Computer Systems, Inc. downplayed the seriousness and potential impact of the price cuts. But others are taking it seriously.

"It's too early for us to take any action, but we've really got to look at [pricing] much more closely," Dell spokesman Brian Fawkes said.

Dell was slapped with a Compaq lawsuit in the U.S. last week that charged it with false advertising in its long-running price comparison campaign.

Wyse Technology said it hopes to avoid a price war but will respond if it feels pressure from other second-tier players. "It's going to be a hell of a year," said Ron Okamoto, director of product marketing.



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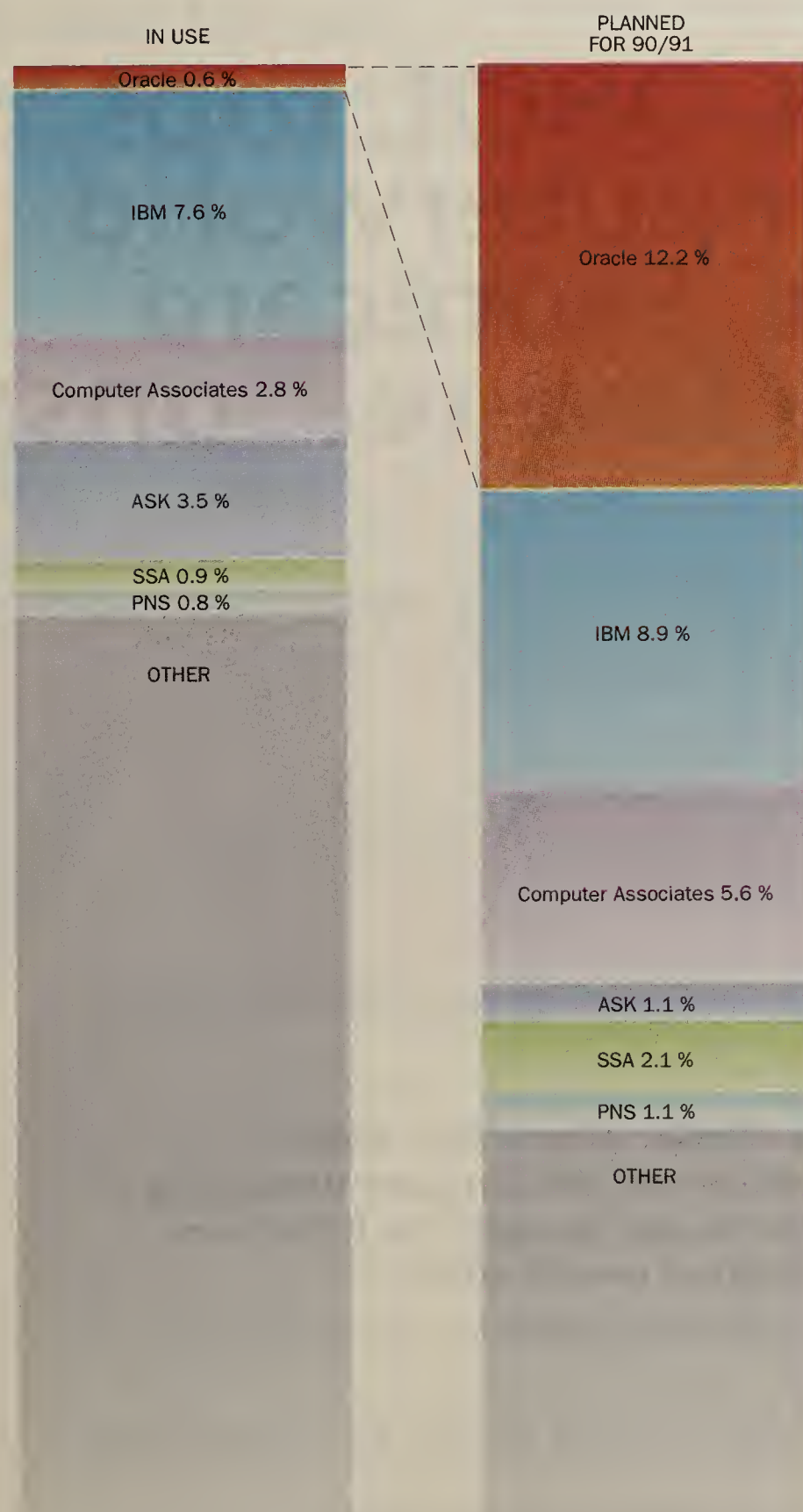
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## AS/400

CONTINUED FROM PAGE 1

information systems at Chemical Waste Management, Inc. in Oakbrook, Ill. The company has 20 AS/400s at its headquarters, with another 20 located at other facilities and remotely managed.

Perhaps the greatest relief for capacity-strained users will be the arrival of the mainframe-power Model D80, reported to have 2½ times greater throughput than the present top-end Model B70.

The Model D80 equals an IBM 3090 Model 200 in capacity, communications ports, disk space, memory and internal I/O architecture, and it can handle a mainframe-style work load, said Teresa Elms,

president of Elms Technical Communications in San Diego.

"IBM has completely refreshed the whole product line," Elms said. "They changed the processor technology, the internal packaging, everything."

### Some things won't change

What will not change, however, is the ability of the D models to run all previous AS/400 applications and peripherals. While the D80 processor will not run any faster than the current B70 processor, analysts noted, the presence of two of them doubles the machine's work load capacity.

One company already in line for a Model D80 is Hills Pet Products, Inc. in Topeka, Kan.

"We need an upgrade pretty badly," said John Waetzig, manager of computer operations at Hills Pet Products. "We're looking at getting two D80s: one here and one in our distribution center in California."

Among several improvements to the OS/400 operating system, Waetzig said he is particularly interested in a "performance adviser" tool that analyzes machine performance and teaches users how to better tune their AS/400s.

"That is something really needed," Waetzig said. "On the B70s, tuning is a full-time job."

Batch processing has been another weakness of the AS/400, he added, but a dual-processor architecture should strengthen those capabilities.

## Opening up AS/400

IBM is repositioning its premiere midrange Application System/400s as "full-range" systems and will start trumpeting a theme of "openness" for its proprietary line.

That does not mean there is a Unix operating system in the AS/400's future, however. Rather, it signals the arrival of more industry-standard open interfaces and development tools, improved C compilers and the ability to attach the AS/400 to multivendor networks.

Analysts who have been briefed on the new machines said IBM is anxious to move its profitable mid-range line into a position where it can be hawked as an applications file server.

"IBM does not want to position the AS/400 as a conventional local-area network server or data storage device for PCs. It's just not cost-effective," said Teresa Elms, president of Elms Technical Communications in San Diego. "They do want people to start thinking of it as an applications server for a network."

IBM will also be unveiling personal computer connectivity products, plus client/server and cooperative processing applications from third-party vendors. Synon, Inc. in Larkspur, Calif., for example, is expected to announce today an entry-level computer-aided software engineering tool for low-end AS/400s. The applications generator tool, which IBM will distribute, produces database design and native RPG applications with SQL generation.

The price and power of the D models are also expected to accelerate the migration of hordes of hesitant System/36 users into the AS/400 fold, said Carson Soule, president of Computer Applications Specialists, Inc. in Beltsville, Md. "System/36 users who were looking at having to spend \$150,000 to move to an AS/400 will now be looking at \$100,000 — and price is a key issue with these people," Soule said.

IBM will be rolling out a host of new or improved products for just about every nook and cranny of the AS/400, analysts said.

One example is the Programmable Input/Output Processor, which will allow users to attach foreign devices, such as electronic weight scales or radio frequency input programmers, to feed data directly into the AS/400 database.

"That would come in handy for us because we use radio frequency input for tracking waste materials through our facilities," said Mike Hansen, director of IS at Chemical Waste Management. "Right now, we host that through personal computer networks, but a direct interface for that kind of stuff to the AS/400 would be pretty neat."

MARYFRAN JOHNSON

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Michael L. Sullivan-Trainor, Senior Editor, Computerworld, in the March 25, 1991 issue

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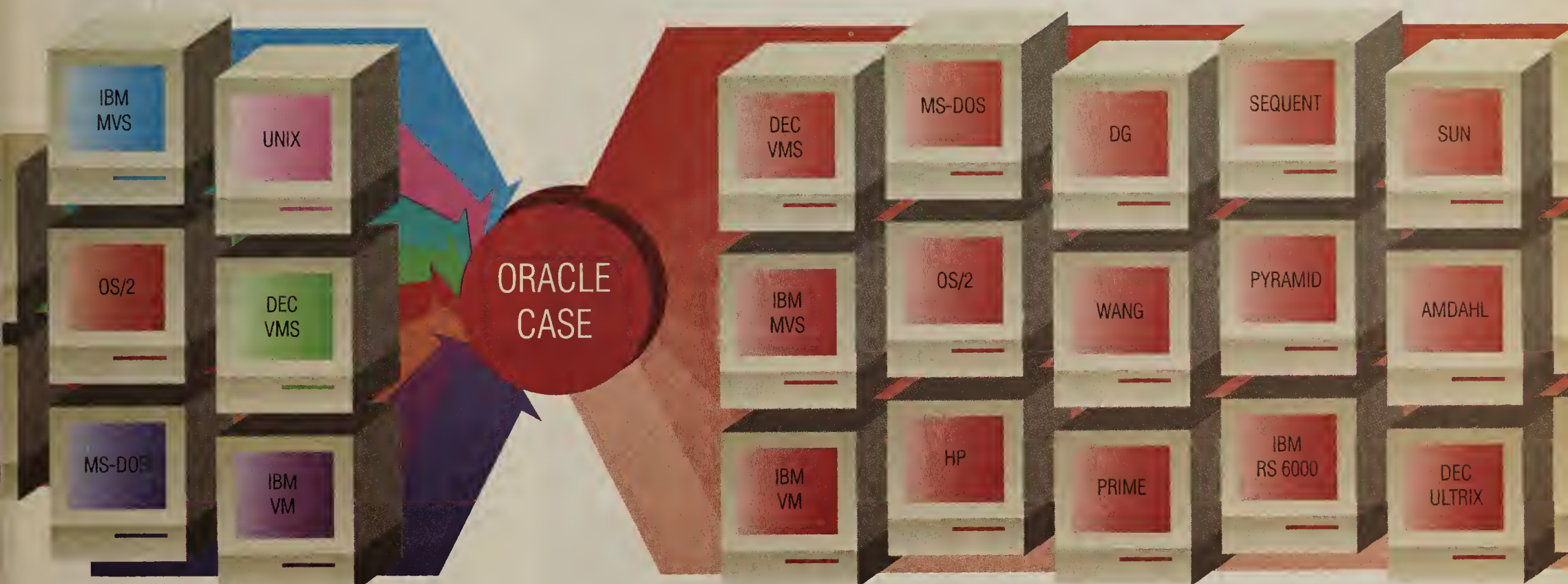
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# Microsoft beefs up E-mail package and price

BY JIM NASH  
CW STAFF

REDMOND, Wash. — Network administrators surprised by Microsoft Corp.'s new electronic mail package might be suffering more from sticker shock than amazement with the product's speedy introduction.

One systems analyst estimated his company will have to spend three times the money for Microsoft's mail package compared with the Consumers Software, Inc. product on which it is based.

Microsoft announced last week the shipment of Microsoft Mail Version 2.1

for personal computer networks. A Microsoft spokeswoman said the software is the firm's first mail product for PCs and supports DOS and Microsoft's Windows. It currently markets Microsoft Mail for Apple Computer, Inc. Appletalk networks.

Microsoft Mail for PC Networks is a repackaged, debugged and repriced version of Consumer Software's Network Courier Version 2.1. Microsoft bought Consumers Software early last March to absorb the Network Courier line.

While few industry observers said they were surprised by the acquisition, some said they are uncomfortable with Micro-

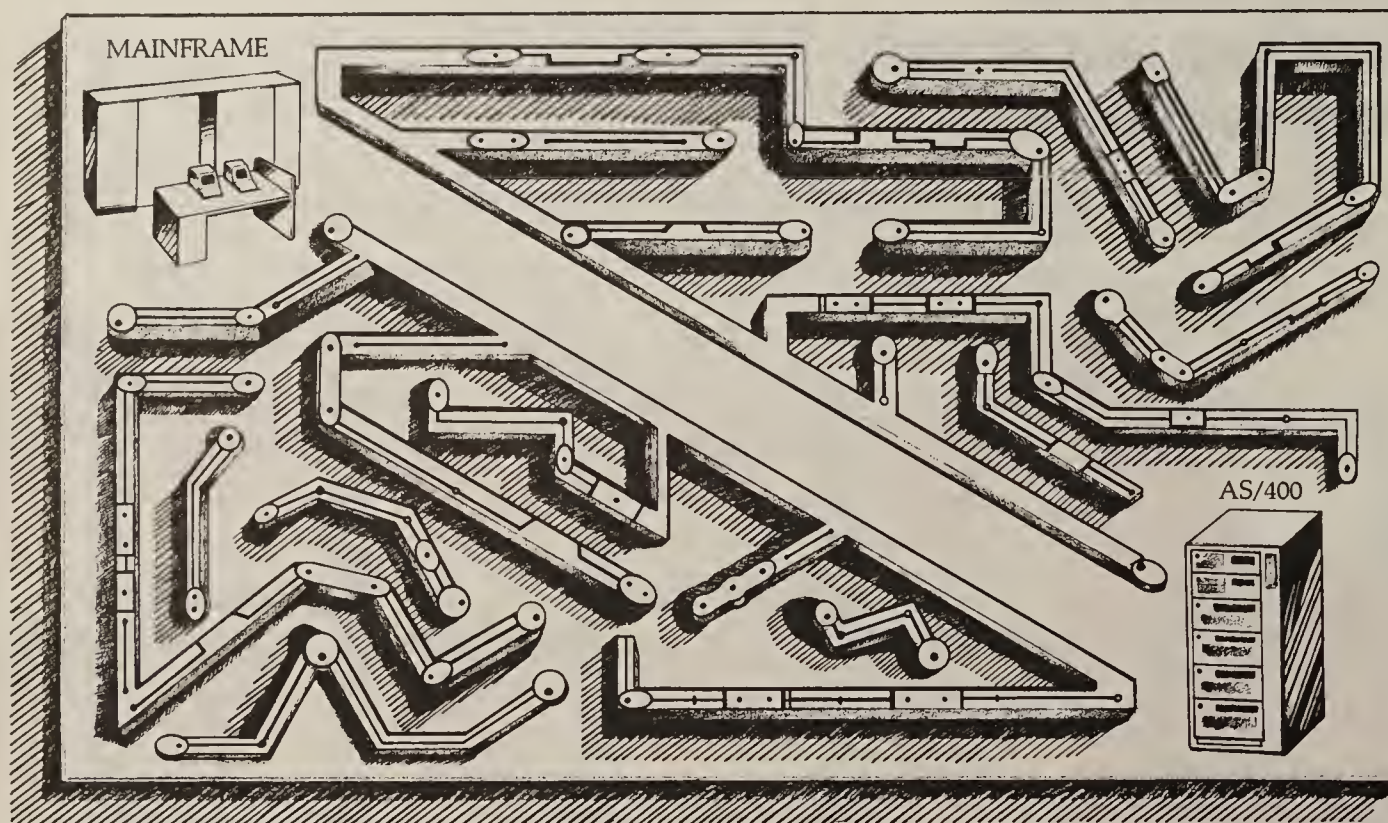
soft's pricing strategy for Microsoft Mail. One systems analyst who participated in a beta test of the product said the price for a complete 100-user version of Microsoft Mail is about triple that of a comparable version of Network Courier from Consumers Software.

"We'll pay it," said the user, who requested anonymity, "but we'll be looking for much more support" from Microsoft. Microsoft Mail is being sold in two pieces. For \$695, customers can buy a complete mail server and a single-user license. License packages for five, 20, 100 and 500 users are sold separately for \$395 to \$22,500. Free upgrades are available to

licensed Network Courier users.

The user said Consumers Software packaged server components separately, but purchasing Network Courier for 100 users in the past meant an outlay of about \$2,000. The same package from Microsoft will run \$6,195 before taxes. In addition to better support, the source said he would like to see dynamic data exchange features that would allow text produced with Microsoft Word, for example, to be directly sent over Microsoft Mail. Right now, that is a two-step process.

Shane Kim, product manager for Microsoft Mail, said costs did not actually triple, given that many previous limitations on the software have been lifted. For instance, Kim said, Microsoft Mail supports many network operating systems, including those from Novell, Inc., IBM, Banyan Systems, Inc., 3Com Corp. and Microsoft. Previously, he said, customers had to buy Network Courier packages for each networking system.



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## Racal to unify by restructuring

BY JOANIE M. WEXLER  
CW STAFF

SUNRISE, Fla. — Racal-Milgo last week confirmed a corporate reshuffling aimed at alleviating customer confusion and headaches in tapping its disjointed spectrum of networking products.

The expected reorganization of Milgo and siblings Racal Interlan, Racal-Milgo Sky Networks and Racal-Quanta, all owned by the \$3 billion, UK-based Racal Electronics PLC, reportedly includes a 350-person layoff at Milgo during the next 30 days. The \$300 million Milgo is known chiefly for its modems, multiplexers and associated network management systems.

James K. Norman, president of Milgo and Racal Data Communications, U.S., said the 13% staff reduction is part of an effort to "pull together our acquisitions into a unified rather than fragmented" organization that addresses customers' growing needs for enterprisewide networking and one-stop shopping.

However, some industry observers said a Racal consolidation may not be as important to customers as new product development and a better understanding of the vendor's offerings.

Steven A. Taylor, president of Distributed Networking Associates in Greensboro, N.C., indicated that Milgo is hurting financially because the time-division multiplexer market is flat, and the company has yet to produce a new generation, frame-relay switch. "Frankly, I don't see a great deal of pressure from customers to one-stop shop. Users just want good equipment at good prices," he said.

Milgo customer Bill Conley, manager of information technology services at Loral Aerospace Corp. in Newport Beach, Calif., agreed: "I look to an AT&T, IBM or outside consultant for architecting my network. I then turn to Milgo and ask, 'What pieces can you supply?'"

Part of the reorganization already in effect is the replacement of Randy Phillips, president of Boxboro, Mass.-based local-area network company Interlan, by Robert A. Steinkrauss, formerly senior vice president of finance at Milgo.



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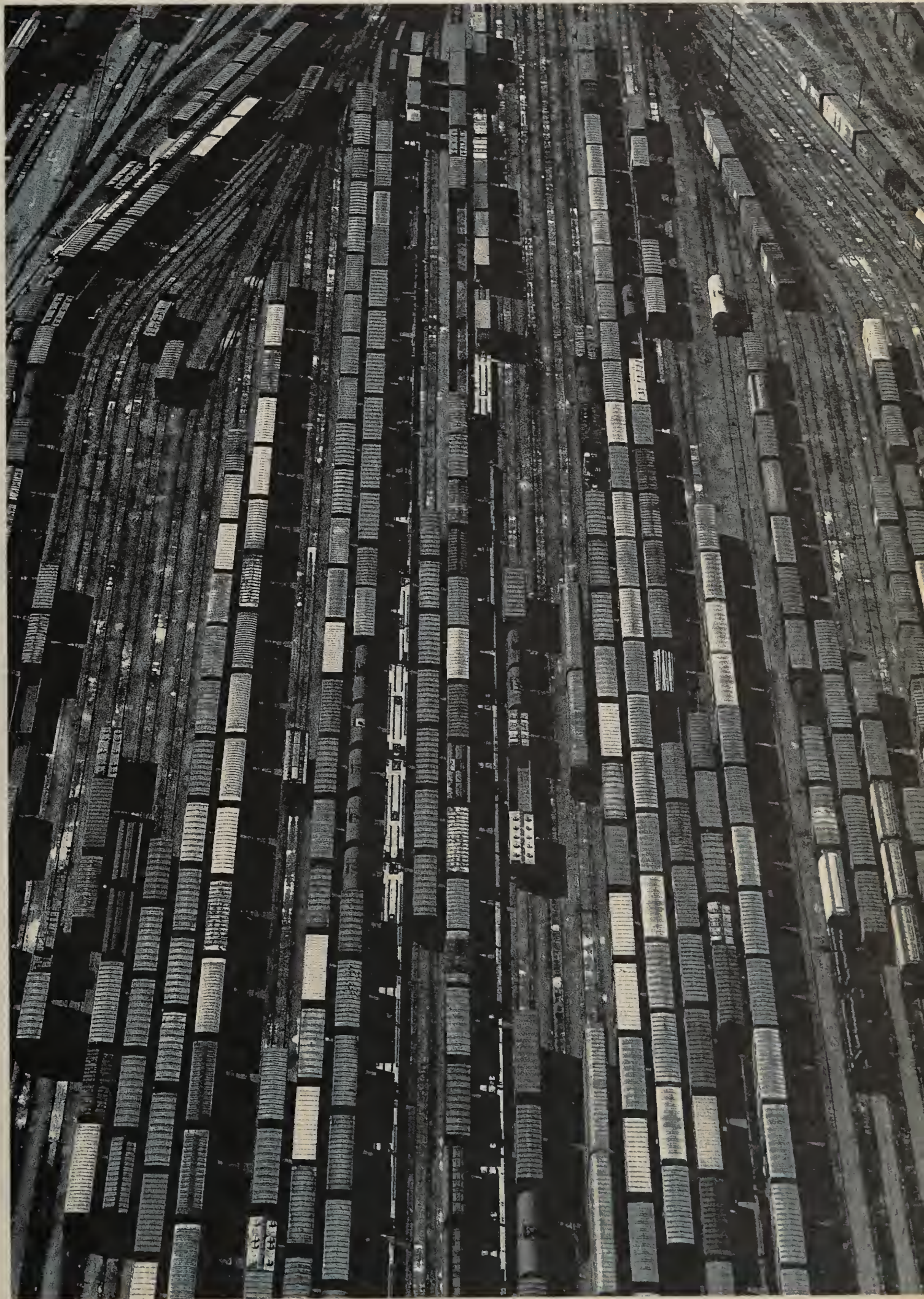
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# IBM meeting to address South Africa again

Shareholder support has been growing for company to end all business ties with country

BY J. A. SAVAGE  
CW STAFF

For the fourth year in a row, IBM stockholders will consider a proposal to stop all direct and indirect sales of computers to South Africa until apartheid ends.

The resolution, to be offered at the annual shareholders meeting in Kansas City, Mo., next week, has gained steady support from IBM employees and religious organizations, said James Leas, author of the resolution and a staff engineer at IBM's semiconductor plant in Manassas,

Va. "I believe IBM's sales to South Africa strengthens white rule, adds to its military power and puts human lives at risk," he said.

IBM's response stated that apartheid is "morally repugnant," but that "responsible business activity and social programs carried out by American and other companies in South Africa have contributed to ending apartheid and creating a postapartheid economy and society."

In a proxy statement, holders of 87,750 IBM shares — endorsed by 554 employees from the U.S., Europe and Ja-

pan as well as 17 church groups — made their intent known to the company. Shareholder support has been steadily increasing, from 9.9% in 1988 to 17.2% last year.

Last week, the 12-nation European Community (EC) agreed to lift economic sanctions against South Africa, despite pleas from the African National Congress. The EC cited continuing government steps to dismantle apartheid. The Investor Responsibility Research Center, Inc. in Washington, D.C., however, pointed to continuing racist policies of the South Af-

rican government, such as the black majority being prevented from voting.

IBM's sales to South Africa through a direct-marketing arm affect its ability to sell to local governments in the U.S., which Leas said presents the threat of more lost profits than the company stands to gain from South Africa. IBM estimated in 1986 that revenue from South Africa amounted to .05% of its income. "It has not been sized since then," an IBM spokesman said.

About 115 city, county and state governments have statutes prohibiting buying products from companies that do business in South Africa. However, some have construed that to mean that if a company sells through an arm's-length relationship, it does not violate local law.

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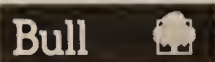


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## Audio innovator files Chapter 11

BY JOANIE M. WEXLER  
CW STAFF

REDWOOD CITY, Calif. — Cold feet in the music industry have booted technological innovator and *Computerworld* *Smithsonian Award* winner Personics Corp. into Chapter 11 reorganization, according to company founder Charles Garvin.

Garvin said "industry acceptance" issues have forced Personics to withdraw its custom audiocassette recording systems from 250 retail stores throughout the country. Discomfort on the part of the record companies about the firm's innovative method of music delivery and its perceived potential for cannibalizing new album sales, he said, have caused the recording companies to cease supplying Personics with new music releases, drying up its business.

Personics won a *Computerworld* *Smithsonian Award* for technology innovation last year [CW, July 23, 1990] for developing a data compression-based system that allows customers to choose a custom repertoire of musical selections. Up to 90 minutes of music can be ported to an audiocassette from a compact disc-resident database in about 10 minutes.

### Effects on sales

"The Personics system wasn't inhibiting my album sales at all; in fact, it was bringing in business," said George Mull, general district manager at Coconuts Music & Movies in Natick, Mass. Mull's Personics system had been in his store since it opened last June, and Mull described it as a low-maintenance system that he regretted losing.

Garvin said that Personics market tests in stores chosen by retailers showed no negative impact on album sales; rather, they showed an increase of about 39% in label and artist royalties, he said. Personics' arrangement with six major record companies entitled the companies and artists to "the richest royalties paid in the industry," he said.

Garvin is currently ramping up a direct marketing campaign for selling customized tapes of the songs he has already licensed to an "oldies" audience. "Our experience is by no means unique," he said. "The entertainment companies were bitterly opposed to the home movie and cable television innovations in their day."



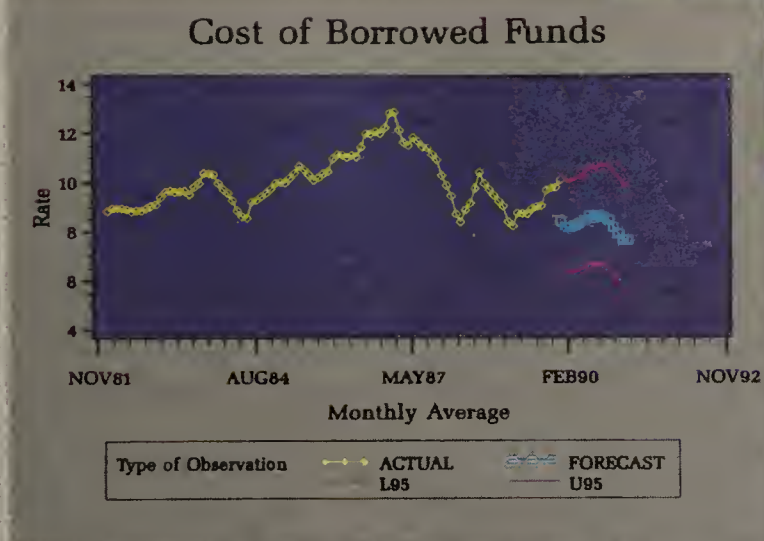
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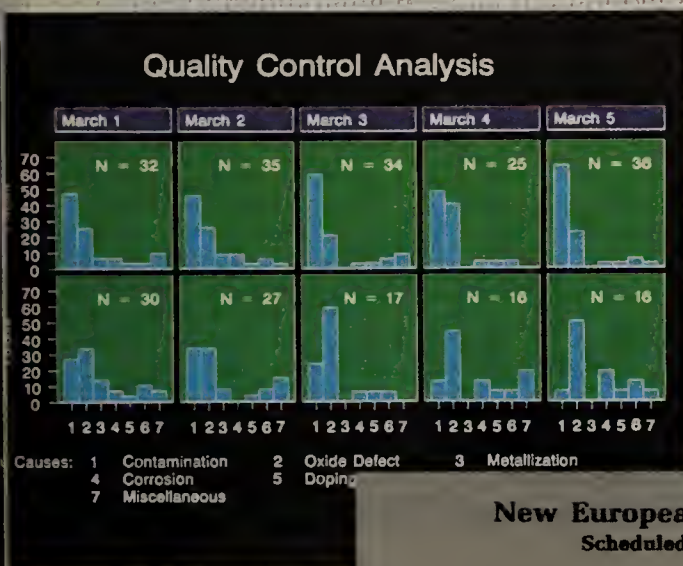
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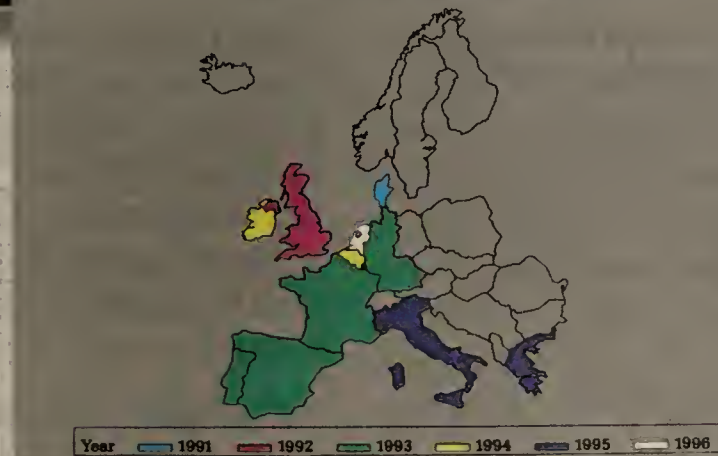
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# 3Com to deliver OSI software

*Applications for DOS-based PCs, terminal servers announced recently*

BY JIM NASH  
CW STAFF

Aiming at a still relatively narrow market, 3Com Corp. said it will deliver Open Systems Inter-

connect (OSI) connectivity software for clients and servers.

3Com, fresh from redefining itself as a wide-area network company last year, announced two OSI applications for DOS-

based personal computers and one for its terminal servers.

The Santa Clara, Calif.-based company said its dual-protocol Connection Service software for Transmission Control Protocol/

Internet Protocol (TCP/IP) and OSI will ship to terminal server users in June.

Available immediately is 3Com's OSI Internetworking, an application that enables government agencies to use Microsoft Corp.'s LAN Manager Version 2.0 over IBM's Netbios and still adhere to Government OSI Profile (GOSIP) 1.0. 3Com said it will ship its OSI/End Systems

with Demand Protocol Architecture next month. OSI/End Systems runs on any network operating system.

Connection Service will give terminals and PCs concurrent access to minicomputers and mainframes running TCP/IP and OSI; the service will cost \$750 per server. Both OSI Internetworking and OSI/End Systems will enable PCs to support OSI's Virtual Terminal Protocol and File Transfer Access Management. OSI/End Systems is priced from \$650 for a single-user license to \$4,995 for 30 users. OSI Inter-

**S**EVERAL ANALYSTS SAID 3Com moved strongly ahead with OSI development as many as three years ago but found only meager rewards then.

netbios will cost \$1,295 for each server.

The products are "conceptually significant," said Peter Stevens, chief of the communications and computing technology division of the Bureau of Labor Statistics. Stevens said the bureau primarily runs under Xerox Network Systems (XNS) protocols, with TCP/IP gaining ground.

Like other government agencies, the bureau must eventually comply with GOSIP standards and now faces the "double conversion" from XNS to TCP/IP and then to OSI, he explained. These products, Stevens said, will help the agency convert one step at a time. He added, however, that these are preliminary products, and the bureau probably will wait for revisions before signing on with the software.

A spokesman for 3Com admitted that the firm's target market with the three applications is limited to private and semiprivate European companies, U.S. and foreign governments and U.S. defense contractors. Most industry observers said the OSI market remains pitifully small next to TCP/IP.

For some, 3Com's announcement marked either the company's desire to distance itself from last year's decision to retreat from local-area networking or an indication that it saw new opportunities. Several analysts said 3Com moved strongly ahead with OSI development as many as three years ago but found only meager rewards then.

"It must mean they finally smell some blood," said Dan Lynch, president of market research firm Interop, Inc. in Mountain View, Calif. "They did their homework and left it home," Lynch said. "Now they are bringing it back out."



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## ADVANCED TECHNOLOGY

# Complex rotorcraft flight simulators soar

*Georgia Tech's training device lets pilots keep their feet on the ground while learning how to navigate the skies*

BY SALLY CUSACK  
CW STAFF

**F**light simulators are widely used to train civilian and military pilots flying fixed-wing aircraft. Now, researchers at the Georgia Institute of Technology in Atlanta are working on a flight simulator for rotorcraft, which have more moving parts than airplanes and subsequently are more difficult to simulate.

The Georgia Tech simulator emulates the U.S. Army's UH-60 Blackhawk helicopter and will later emulate the Apache helicopter, which played a key role during Operation Desert Storm in Kuwait and Iraq. The system will be capable of simulating the flying of any rotorcraft for which mathematical models are available, researchers said.

"We want to enhance the pilot's perception of what it's really like to fly the craft," said Maj. William Lewis, one of the researchers and a test pilot in the U.S. Army.

Instead of relying solely on airborne practice, pilots complete portions of their training on the ground,

using Disney World-like parabolic simulations that reproduce the feeling of movement and actual flight.

"It's similar to some of the attractions at Epcot Center, where you're strapped into a seat anchored to a floor, and the visual display creates the illusion of movement," Lewis said.

### Just the beginning

The first phase of the project includes only forward-looking displays for now, but side-view displays will soon be added to the system to enable pilots to brush up on their hovering skills. Engineers will also be adding enemy attack simulations, which will allow pilots to stage mock battles.

At Georgia Tech, the research team is developing its flight simulator on a Silicon Graphics, Inc. VTX 380 Powervision series workstation, which features eight parallel processors. The simulator is also equipped with Flightlab 480 Simulation software from Advanced Rotorcraft Technologies, Inc.

Most existing flight simulators rely on serial processing, which produces a fractional delay between command and response times — up to

one-third of a second.

Tests show that parallel computing architecture is ideal for simulating typical helicopter flight movements, such as hovering, reversing directions and maneuvering in tight spots.

According to Lewis, parallel processing increases the system's response time, which is extremely valuable when training pilots.

The simulator is also ideal for training military pilots in the simultaneous multitasked tasks such as flying the craft, finding targets and shooting weapons, Lewis said.

"Reactions must be instantaneous for the pilot to know the system is responding," Lewis explained. "One of the main advantages to parallel architecture is a .057 [of a second] execu-



Joe Schwartz/Georgia Tech

**Flight simulators** that are designed at the Georgia Institute of Technology simulate lifelike experiences for pilots during their training

tion time."

To run the simulator in real-time mode, individual components of the machinery are broken down into specific segments, and then the segments are run together simultaneously. The technique allows for a smoother, more rapid flow of data, and the graphics software then adds the texture to allow pilots to discern motion in a three-dimensional format.

## Expert system calculates space shuttle payload configuration

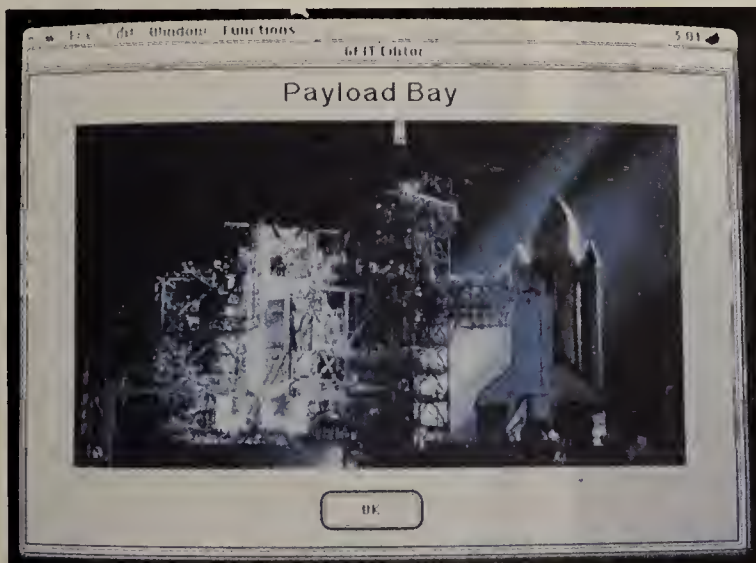
BY MICHAEL ALEXANDER  
CW STAFF

**C**alculating how a payload should fit in the cargo bay of a space shuttle takes considerable experience. So formidable is the task that only two men can do it with any certainty. One of those men retired recently, and the second is nearing the day when he will do the same. That thought worried the ground systems integration technical staff at Rockwell International Corp.'s Space Systems Division enough that they developed an expert system to carry on when human experts are not available.

"The shuttle program now spans a generation," said James Engle, ground systems engineer. "One of our two experts for analyzing payload-to-ground systems compatibility has already retired, and the other is a senior member of the technical staff. It has become imperative that we capture the knowledge these men pos-

sess because otherwise, when they leave, their knowledge and skills leave with them."

The Rockwell staff members and Expertelligence, Inc., a Santa Barbara, Calif., expert system shell devel-



**G-Fit** allows engineers to analyze a payload on-screen and make adjustments in the configuration for storage inside the space shuttle's cargo bay

oper, have created an expert system called G-Fit to capture the knowledge accumulated by Rockwell's configuration experts over the past 15 years.

G-Fit, short for Ground System to Flight Payload Integration Tool, is an object-oriented expert system that

allows engineers to interactively configure a payload on-screen and analyze it to see how well it fits in the cargo bay of a space shuttle.

The expert system, which runs on an Apple Computer, Inc. Macintosh II, includes a graphical user interface that engineers use to fit together pieces of a payload, like a jigsaw puzzle.

Payloads — satellites, telescopes and gear needed for scientific experiments — must be stowed on board while the orbiter is in its vertical launch position. The entire cargo must be designed to slide flawlessly into place as a single unit so that nothing obstructs the closing of the payload bay doors. The trunnions, or pins, supporting each of the payload's components must slip into their holding fixtures within minute tolerances of only one-hundredth of an inch.

Each payload configuration is unique, and it often takes weeks for experts at Rockwell's Space Systems Division to assemble payloads and try out each configuration on paper. "At any given time, there will be several different flights in work, and each flight requires at least four reviews," Engle said.

G-Fit has been used in configura-

tion testing on several shuttle missions, although it is not the sole testing tool. "The overall task has required about 40 hours per week," Engle explained. "In automating the routine and repetitive manual activities, we have been able to recapture a large block of time that can be better used for creative problem solving."

### On the inside

The knowledge base contains two key components: the physical dimensions of the payload bay and mission-critical devices mounted on the bay's sides as well as the rules governing the use of the available space and devices.

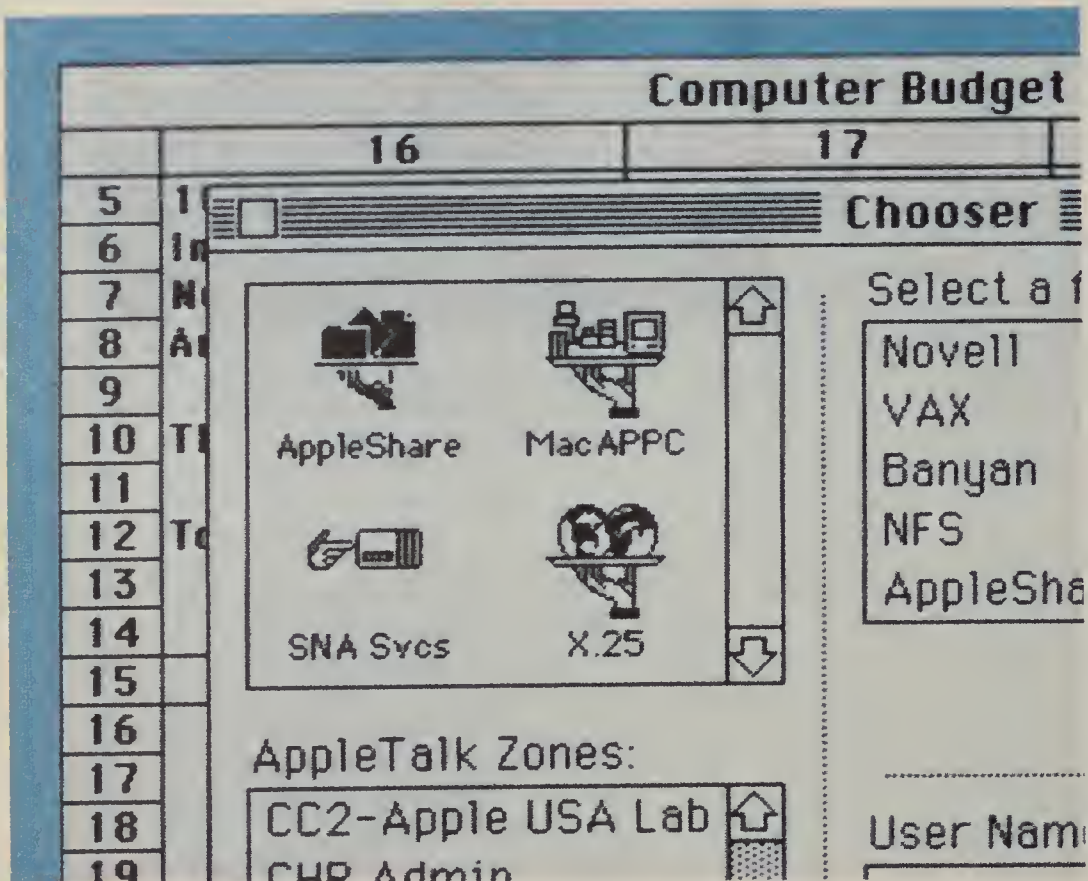
The G-Fit operator adjusts the overall configuration of the payload drawing from a palette of objects representing payloads of different sizes, cameras and other components. Payloads created on-screen can be tested and refined until the knowledge base signals that the cargo bay can accommodate the configuration.

Once testing is completed, the operator produces a printed report and drawing of each payload for contractors, who determine whether the planned unit can be conformed to the payload configuration. If not, they propose alternatives and submit them to a new round of testing.

Eventually, the payload is assembled and inserted into an upright, cylindrical payload canister that is an exact duplicate of the orbiter's cargo bay. The payload is then transported to the launch site and loaded into the orbiter.



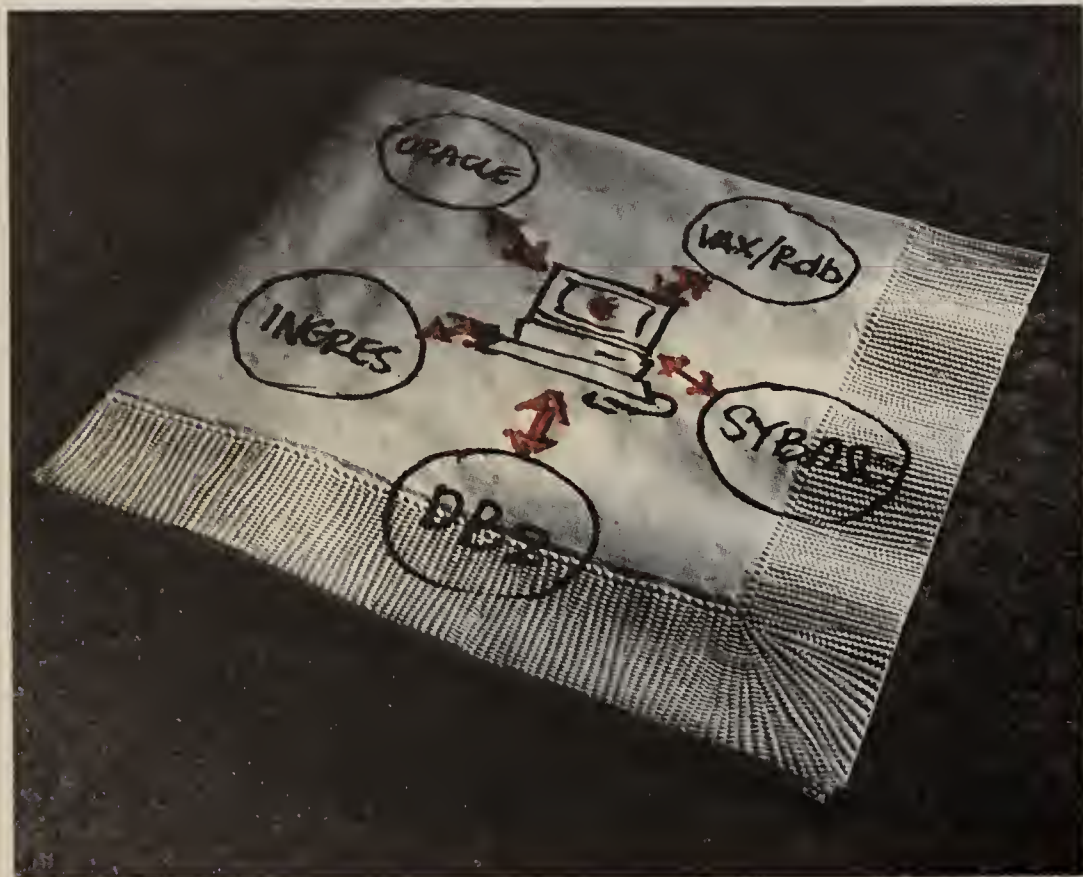
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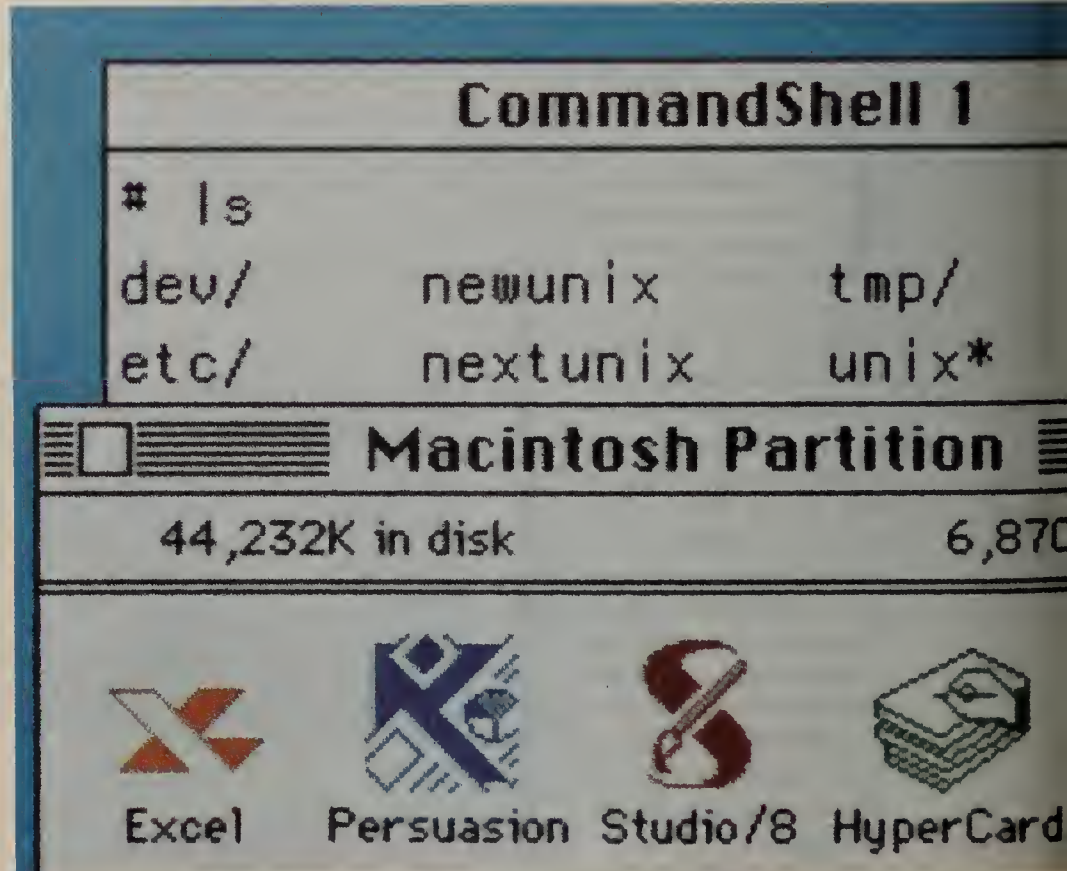
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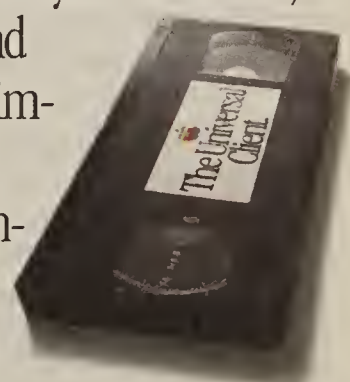
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## EDITORIAL

## Blind ambition

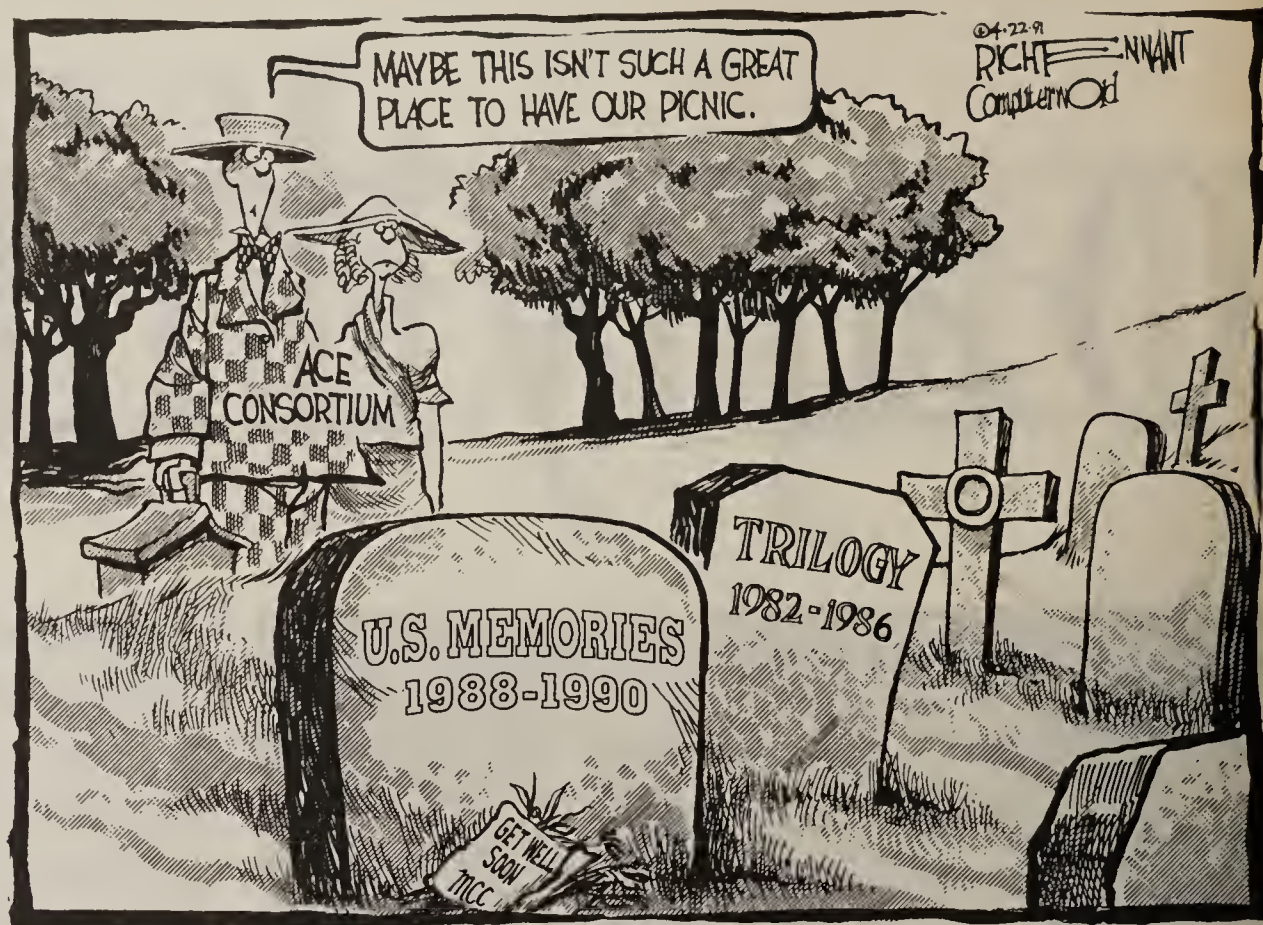
**M**ICROSOFT MUST BE feeling like a pincushion right now. First there was the revelation that the Federal Trade Commission was investigating it for allegedly trying to corner the PC operating system market. Then that probe broadened to include a whole host of Microsoft activities in both software and hardware. Then Apple, perhaps smelling blood, told Microsoft last week it would broaden its copyright infringement suit to include the hot-selling Windows 3.0.

Microsoft has reacted to its recent adversity a little bit like a hurt puppy. It professes bewilderment that so many people could wish it ill. It has even asked industry opinion leaders to help it get at the root of its image problem.

It shouldn't have to dig too deep for an answer. The fact is, Microsoft *does* dominate the PC software market to a degree that makes many people very nervous. It has achieved that success through a combination of excellent technology, brilliant marketing, visionary insight — and blind ambition. Where it has gained the upper hand early (MS-DOS), it has preempted alternatives. Where it has met a worthy foe (the Apple Macintosh), it has turned competition into opportunity. It has stuck with technologies it believed in (Windows) long after most companies would have written them off. It has been quick to get out of markets (Access) where it realized its product wasn't up to snuff. It has danced with a bear (IBM) and led the waltz.

But Microsoft has also made enemies in its climb to the top. Ask 3Com, which had and then lost a preferential marketing deal for LAN Manager. Ask Lotus, which invested in OS/2 Presentation Manager largely on the strength of Microsoft's commitment. Ask IBM, for that matter. The Microsoft magic has been based in part on its willingness to put its own ambitions ahead of others'. That ambition is what draws such scrutiny to everything Microsoft does. It doesn't matter that the company claims its penpoint operating system has nothing to do with the technology that Go Corp. once demonstrated to it in private. Competitors will cry foul. It makes no difference that Microsoft claims to have a wall between its systems and applications groups. Success engenders suspicion. It might argue that things changed after it declared in November 1989 that Windows wouldn't challenge OS/2. That's little comfort to the developers who poured millions down the OS/2 drain.

Microsoft appears to want to dominate the market and still be loved. Unfortunately, its current methods don't permit this. If the firm indeed wants to project a gentler image, it should be more willing to share or even concede some markets instead of trying to bulldoze them. It should learn to live with commitments it has made, even when they aren't in its own best interests. Perhaps it should even cut short the monopoly debate by putting the MS-DOS standard into the public domain. These changes wouldn't boost Microsoft's short-term profits, but they would buy the company the goodwill it apparently craves.



## LETTERS TO THE EDITOR

## Readers rally for the repeal of Section 1706

I enjoyed Mr. Coates' analysis of technology in "Leaving the Computer Stone Age" [CW, April 1]. However, I'm afraid the U.S. will have a tough time leading the way out of this era.

It took *Computerworld* four years to come out against the bias of Section 1706 where the net results were that many independent contractors lost their livelihoods, and competition was stifled in the consulting market. I take it that *Computerworld's* stand was timed to coincide with Mr. Coates' article.

We will not leave this Stone Age until the U.S. takes a more long-term "what is right" approach on tax law and funding and not the current "where do we make up the shortfall in revenue?" attitude in Washington.

Americans must convince their politicians to stop thinking of short-term special interest and start thinking long term on tax law and funding affecting education, environmental and health care issues. Maybe then the American manager will learn another programming language, and trade newspapers will offer classes in leadership.

Steve Larson  
Cowie Computing Co.  
Evanston, Ill.

You really hit the bull's-eye with your "Repeal 1706" editorial [CW, April 1]. Section 1706 has not benefited our customers, our industry or our country. You mention that 1706 was "tacked onto the Tax Reform Act without debate or proper hearings." Adapso members have not debated or held hearings on the issues either, and yet our dues are spent to support 1706.

We don't need laws that re-

strict the rights of small businesses. Entrepreneurs have built our software industry. Many of today's leading software companies began as small professional services companies. Restricting the right of a software professional to operate as a small business can only have a negative impact on our country's leading-edge position in software technology.

I hope that editorials like yours will lead to the death of unnecessary legislation like 1706. Now is the time for Adapso to unify its memberships around the real issues facing the information technology industry. Rather than stifling small businesses, invest in software innovation. This is the spawning ground for our strong, vital software and services industry.

William M. Braasch  
President  
Data Base Architects, Inc.  
Alameda, Calif.

I have to compliment you on taking the correct side of the 1706 issue with your editorial [CW, April 1].

There are two points, however, that need to be clarified, which you did not illuminate. First, 1706 is not revenue neutral, it costs the government money. Independent contractors are the most efficient means of delivering computer services to businesses. This efficiency allows greater revenue and thus higher taxes paid than large service organizations with tax-deductible unnecessary overhead.

To use myself as an example, as an employee in 1985 I made \$36,000 and paid \$4,200 in taxes; in 1986, I made \$60,000 and paid \$17,000 in taxes. Last year

I paid more in taxes than my combined taxes from 1978 (my first computer job out of college) to 1985 (my last year as an employee). Anybody claiming that the government makes more money with me as an employee is clearly misrepresenting the facts for their own hidden agenda.

Which brings up my second point. Adapso should be publicly berated for their support of 1706. They are acting against the best interests of the computer industry as a whole. The main supporters for 1706 are the large inefficient service firms whose direct competition is the independent contractor. Their inability to compete on equal terms has left them pursuing legislation and other economic harassment to maintain their market share.

Let the industry beware. The next step for these organizations, especially if 1706 gets repealed, is certification. Who do you think will predominate the certification boards? Those who donate large sums of money to politicians to pass bogus legislation in the middle of the night, that's who.

Steve Johnson  
President  
Software Development Factory  
Hunt Valley, Md.

*Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail: COMPUTERWORLD. Please include a phone number for verification.*



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31. Mgrs., Supvr. of Programming, Software Dev.  
32. Programmers, Software Developers  
60. Sys. Integrators/VARs/Consulting Mgt.  
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12. Vice President, Asst. VP  
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51. Sales & Mktg. Management



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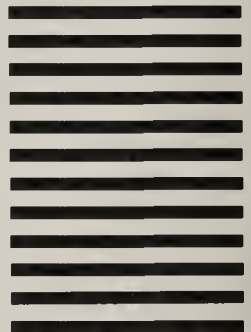
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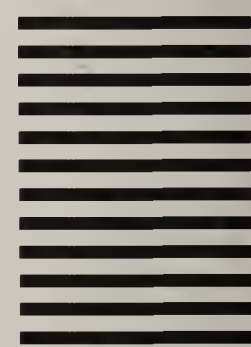
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# Knowing too much but too little

*Can you be both over- and underqualified? The job market says 'yes'*

MELVIN NISKA



It is a phenomenon of the economic times that some of us are overqualified and underqualified at the same time. I know this firsthand because on Dec. 11, I was "downsized" out the door at Unisys.

The euphemism "overqualified" means that your present or most recent salary is greater than what employers want to pay in today's "bargain basement" job market.

Never mind that today a person has accepted the fact that to become re-employed means adjusting to a reduced salary. Never mind that re-evaluation and financial regrouping has taken place, along with self-analysis, personality testing, career assessment and so on. The people with jobs to fill just don't believe it. They are afraid that if they hire me, I'll be gone as soon as times improve.

This focus on salary is also a handy way to screen resumes. Depending on whom you talk to, the number of resumes that come in when a job is advertised

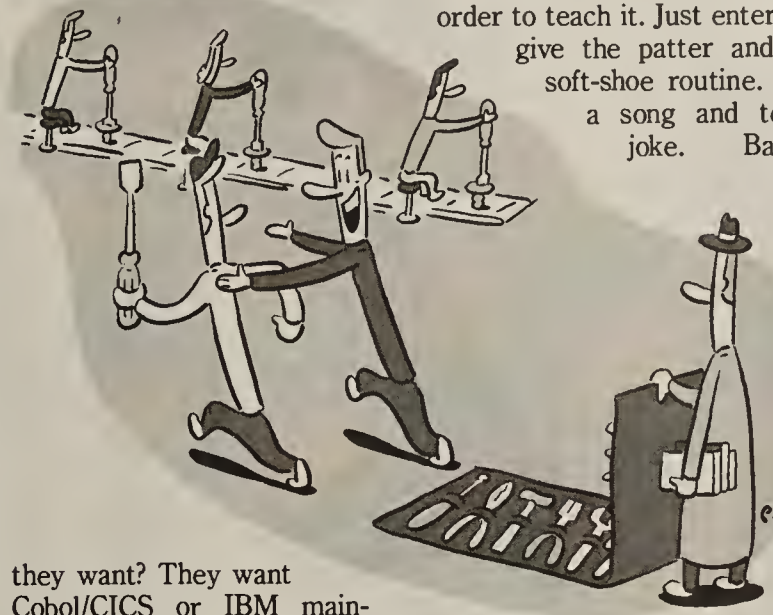
is either 300 or 1,000-plus. So it helps to put this in the ad: "Include salary history. Applications without salary history will not be considered." This allows them to screen out all of us who have 30 years of experience.

However, this kind of thinking is flawed for several reasons. First, the prognosis for business "opening up" anytime in the near future is bleak. Unisys has discarded only about half of its projected 1991 employee count. IBM has announced that another 14,000 jobs will be eliminated. And those willing to make predictions say instances like these are just the beginning. Hence, the employer's market we are looking at today should be even more skewed tomorrow. This makes the possibility of job-hopping almost nonexistent. But watch me carefully because I quit a job 22 years ago!

To be underqualified at the same time means that my resume does not contain the proper acronyms. Consequently, if I am not screened out by the "salary history" ruse, I will be eliminated by a junior personnel person using an acronym template.

An example is Cobol. Firms want someone who knows Co-

bol. I know Cobol, have taught Cobol and have even created instructional material for structured Cobol that has brought some joy into the lives of Cobol practitioners. But what Cobol do



Phil Marden

they want? They want Cobol/CICS or IBM main-frame Cobol or Application System/400 Cobol or HP/Manman/Satcom. The rejection letter to my application for an AS/400 position came back at Mach 4.

Another example is relational databases. I have been working with SQL since it was first developed in the Unisys 1100 series: RDMS 1100, which has compet-

ed well with DB2 all over the world. Dr. Codd's definition is universal. But if you don't have DB2 SQL or Oracle SQL, then you don't have any SQL experience worth mentioning.

Then there's the other dodge — teaching vs. doing. "But you only taught SQL, you haven't really had to *know* it." That's the way people think in today's job market: A person doesn't have to know the subject area in order to teach it. Just entertain, give the patter and the soft-shoe routine. Sing a song and tell a joke. Balder-

dash! To last 15 years as an instructor requires a person who can do it, not just sing about it.

The same goes for management positions. I've been involved with supervision, negotiation, planning, estimating, inventory, even the establishment

of priorities for scheduling my work and the work of others. I've settled office wars and smoothed ruffled feathers. But I have no "track record" as a manager, so I'm easy to screen.

What one can do, is willing to do and has done in the past are confused here. I've done a lot of things in the past that I'm not willing to do in the future. I've washed a lot of dishes. I've cleaned latrines. If there's one thing I'm grateful for, it's that I got out of the mess hall before the job market turned sour.

Trying to figure out what a person is capable of and wants to do is way too complicated for employers now.

Probably because I've spent almost my whole career helping people adjust to computerization, it comes as a shock to see that employers are now insisting on ready-trained employees.

I was a technical writer for seven years, but the ads for technical writers insist on the applicant already knowing the word processor of the employer's choice. Yes, it will take a few days to get accustomed to a new word processing package, but the skill of the wordsmith transcends any tool. Furthermore, no tool, by itself, is going to produce great literature. It takes an underqualified person to do that.

Niska mails his resumes from his home in Andover, Minn.

## Financial data often yields false positives

BILL FROMM



Many people believe that financial statements disclose how well their company is competing in the marketplace.

That simply isn't true.

The only accurate measure of how successfully a company is competing in the marketplace is the trend line of its share of the market. And, sadly, most companies don't know what their market share is.

Most chief executive officers use operating statements to evaluate the health of their companies. But these statements simply describe past profits or losses. They won't give you any clue as to the future. If they did, banks wouldn't make bad loans. Operating statements ignore the strategic health of the company.

Traditional measures of success ignore how the competition is doing. The measurements don't take into account what's going on in the industry. They assume that your company exists in a vacuum.

No measurement except the

market share trend line will tell you how you're doing in relation to your competitors.

Profits won't tell you. You can make money while you lose customers to the competition. Just cut back on the quality of the goods or services you provide while maintaining the price you charge. You'll lose your repeat business, but you'll make huge profits until you run out of new customers. A company can gain a lot of money simply by harvesting — but it could be in bad shape for the future.

Return on net assets won't tell you. That figure reveals only how the investors are making out. It doesn't consider the return that the competition is getting, and it won't give you any idea how the company is going to do in the future. You might as well consult an astrologer.

Another possible problem: Even if CEOs recognize the importance of their companies' market share, many are unsure of how to measure it.

That's where you, as an information systems manager, can make a difference. Instead of continuing to oversee the production of financial reports ac-

cording to old and faulty formulas, propose an alternative. Taking the initiative in this way probably won't get you a bigger IS budget, but it is likely to earn you a lot of respect as someone who really knows how information should be used and isn't reluctant to propose an idea that won't require a big investment in new technology.

You don't have to spend a fortune in research to find out how you're doing in relation to the industry and your competitors. You don't need a fancy new computer system or expensive research sources. You don't even need (and this may sound sacrilegious) exact numbers. It is the trend line of your market share that is important, not whether you're measuring it down to the 10th decimal. You can figure an accurate trend line with less than exact figures as long as you measure your share of the market the same way every year.

The first step you can take toward figuring your company's market share and making financial reports more meaningful is to define your company's market — both geographically and by product category. After you have done that, consult census figures to find the average amount spent on your product category per household. Then multiply that amount by the number of households in your market area to find out how

## What's in a name? A royalty

### READER'S PLATFORM

JAMES SMITH

Computers now reach into virtually every corner of our lives — from birth through death. It's comforting to know that our life is recorded somewhere; at least the computer won't forget. Obviously, much of this information is extremely valuable in the causes of saving lives, paying taxes and so on. Nonetheless, somehow without "big brother" watching, much of the data is available for a price. Maybe it is time that we as individuals say, "I want data on myself or family kept confidential — it's not for sale."

Or here's another idea! All firms that want data have to contact the intended individuals, ask

permission, and pay the source.

Most of us dislike the annoying telephone calls requesting us to buy this stock, time-share or even gold mine but getting paid could make them a little more tolerable (still not buyable but at least tolerable).

If individuals wish their data and their families' data to be used by others, let's have data banks established for just such a reason. We send data to whatever number of data bank firms, and this information is available to other companies for a fee. Then each time our data is used for solicitation, we get paid.

It's time to stop the "free pass." Let's you and I get paid for our individualized data.

Smith is an information systems professional who resides in Marlboro, Conn.

much money your potential customers are spending in your product category. This number is your denominator. Your numerator is your company's sales.

The resulting equation will tell you how well your company is doing. It will tell you how you're competing and, after a few years, it will tell you whether you are gaining or losing ground against your competitors. Most importantly, it will help your

company decide how it should prepare for the future.

Fromm, president of Barkley & Evergreen Advertising in Kansas City, Mo., is conducting a nationwide seminar series sponsored by Sears Business Centers and Toshiba on how to build a high-performance company. This piece is adapted from his book, *The Ten Commandments of Business and How to Break Them*, published by G. P. Putnam's Sons.



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# SYSTEMS & SOFTWARE

## COMMENTARY

J. A. Savage

### Pick market decision time



Last time I was at a Pick Systems convention, it reminded me of an EST seminar: True believers wandered around the floor repeating, "Pick is good. Pick is swell. Pick will run my business well."

Unlike former EST guru Werner Erhard and some other cult leaders, Dick Pick has not been involved in FBI, IRS or other investigations. What he and his business applications software do have, however, is a flock of faithful followers.

The applications have been around for more than 20 years, mostly running on the Pick operating system. Yet, while almost every other computer business is heading toward applications based on open systems platforms, Pick is, well, still Pick. Not only are its followers still following, but it is gaining new vendor subscribers as some open systems vendors have decided to put Pick applications on top of the Unix operating system.

Just in the last month, Sequent Computer Systems and General Automation have announced excursions into the Pick/Unix market, with Pick applications layered on top of the Unix operating system. Traditional suppliers of Pick, such as McDonnell Douglas Systems Integration and Ultimate, are likely to be vulnerable to deep-pocketed marketing organizations like Sequent, which sells multiprocessing computers

*Continued on page 33*

## DEC spreads word: Voice applications

BY MARYFRAN JOHNSON  
CW STAFF

MAYNARD, Mass. — With more than a little help from its third-party friends, Digital Equipment Corp. last week hauled the highly specialized field of voice applications onto its own general-purpose VAX/VMS computing platform.

DEC unveiled two software company alliances with Voicsoft Corp. and Audiotechs, Inc., which are crucial to its plans to pitch a variety of voice applications to businesses with complex computer networks. The company also jazzed up its Decvoice system for voice processing with new features, including the ability

to handle eight channels per module instead of one and to run on VAX 4000 client/server systems as well as Microvax 3000 systems.

"It will take time for DEC to come up to speed, but there is still an awful lot of open ground here," said Albert Lill, a telecommunications analyst at Gartner Group, Inc. in Stamford, Conn. "This is the perfect strategy for them."

DEC will sell and support the Voicsoft voice-mail and call processing applications, making them an integral part of its All-In-1 Phase II networked office computing applications by 1992.

"It is clear that voice is a form of information, and you can man-

### Conference call

*DEC relied on third-party deals in putting together its Decvoice package*



A family of voice mail and messaging software products from Voicsoft Corp. in Rocklin, Calif.

New software tools for developing audiotext voice applications — such as "talking Yellow Pages" or voice information services for newspapers — from Audiotechs, Inc. in Newton, Mass.

Release 2.0 of Computer Associates International, Inc.'s voice applications development tool, CA-DB: Expert/Voice, which is currently in beta testing.

CW Chart: Doreen St. John

age it on general-purpose computer platforms," said Martin F. Parker, president of Voicsoft. He stressed that users can use Voicsoft's applications without changing desktop devices.

### Many attractions

The veterinary medical teaching hospital at the University of California at Davis recently installed a VAX 4000 Model 300 with the Decvoice system, running Voicsoft voice mail. Hospital ad-

ministrator Paul Brentson said the system was attractive both for its ability to automatically create and manage electronic mailboxes and for its potential use in other applications.

"We expect to have room left on the VAX to run staff packages as well," Brentson said.

That expectation is a key point of DEC's conviction that information systems managers want an integrated voice and data environment that can be managed centrally from a host machine running both telecommunications and business applications. A VAX 4000 running Decvoice need not be dedicated to voice, although a 72-port Decvoice system would fully load a VAX 4000 Model 300, DEC officials acknowledged.

So far, the voice technologies market has been dominated by individual vendors with equipment specific to their products. Those vendors are now "madly scrambling for a common voice and call processing platform," Lill said. "What's happening here with DEC and Voicsoft is the ultimate common platform idea."

Yet, Lill said customers who need "hot performance for a special application" more complex than voice mail should plan on waiting until next year to buy from DEC. In 1992, DEC and Voicsoft plan to deliver sophisticated voice and mail networking capabilities as part of All-In-1 Phase II.

## Customer can't believe his ears

**T**he news that DEC had rolled out a host of expanded capabilities in voice processing left a bitter taste in Warren Campbell's mouth last week.

As information systems director at the Better Business Bureau of Eastern Pennsylvania in Philadelphia, Campbell has been struggling for weeks to get Multiline Decvoice working properly on his new, \$82,000 VAX 4000 server.

In the process, he has written twice to DEC President Kenneth H. Olsen, held numerous meetings with sales managers and done enough wheel spinning to grind a furrow in concrete.

"This has been a comedy of errors on their part," Campbell said. "We never knew we were going to be a field test. This was sold to us as a product shipping."

DEC's side of the story is that Campbell signed a letter acknowledging he was getting a prereleased product, but Campbell said he signed the letter as a last-ditch effort to get the system delivered. It was due in January but ar-

rived in late March.

DEC also contends Campbell should have understood that field service personnel would not be fully trained yet nor able to provide complete documentation for Decvoice on the VAX 4000. The original Decvoice product, introduced in 1988, ran on Microvax II systems.

The bureau's plan was to set up an automated voice response system that would greet the caller, who would punch in the telephone number of the business in question. The system would access an in-house database for the information.

"We can't understand why this has been so much trouble," Campbell said.

Neither can DEC. "This is not the way we want to do business," said Carol Palmer, voice segment business manager at DEC. "We have tried to be very accommodating with this customer, and it is unfortunate this happened."

"I just want a machine that works without all the hassle," Campbell said. "Thank God we leased it."

MARYFRAN JOHNSON

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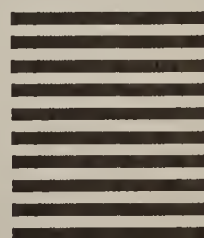
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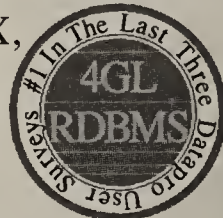
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## SOFT NOTES

Informix  
certified

**Informix Software, Inc.** recently claimed that its Informix Online is the first Unix-based relational database management system to win full certification from the **National Institute of Standards and Technology's** (NIST) FIPS-127.1 standard for SQL databases. The NIST standard is a superset of the American National Standards Institute's SQL standard.

**IBM and Knowledgeware, Inc.** have signed an agreement under which IBM will sell Knowledgeware's three host-based computer-aided software engineering products: Application Development Workbench/MVS, Information Engineering Workbench/Mainframe and ADW/Repository Enablement Facility.

**Bell Atlantic Business Systems Services** in Frazer, Pa., and **The Parsec Group** in Westminster, Colo., recently said they are offering layered product support for 20 applications, languages and utilities running on Digital Equipment Corp. VAX systems as an extension of Bell Atlantic's Dextra Support Program. The layered program includes a toll-free telephone line through which Bell Atlantic technicians can offer assistance or initiate more in-depth assistance.

Software vendor **Hogan Systems, Inc.** recently signed an agreement to market **Banca Corp.'s** Power 1 commercial credit and lending system for financial institutions. Hogan will sell the system to clients in the U.S. and will provide baseline support. Dallas-based Banca will continue to provide maintenance and manage development.

**Parasoft Corp.** in Pasadena, Calif., recently said it signed an agreement with **Ncube Corp.** in Belmont, Calif., under which Ncube will ship Parasoft's parallel processing tools Performance Monitor and Node Debugger with Ncube 2 supercomputers.

## Planning is key at reserve bank

*Preparing for disaster recovery is part of day-to-day life at New York Fed*

BY JOHANNA AMBROSIO  
CW STAFF

At the Federal Reserve Bank of New York, the week of Sept. 29, 1987, will forever be remembered as a nightmare come to life. That week, the computer that runs the Fedwire funds-transfer system crashed twice in two days.

Since then, thanks to a plan that the New York Fed has implemented to increase its fault-tolerant and disaster-recovery capabilities, no other experience has been quite so unnerving. The bank even kept running throughout a nearly week-long blackout in August 1990, although it had to move to its hot site nearly 40 miles away.

During a recent IBM financial services conference in Albuquerque, N.M., Israel Sendrovic, executive vice president at the New York Fed, outlined the bank's transition from a setup that crashed too often for comfort to one with its affairs much more firmly under control.

As one of a dozen reserve banks in the U.S., the New York Fed moves about \$1 trillion each day over its portion of the nationwide Fedwire system. Fedwire is the country's primary mechanism through which commercial and other banks transfer funds and securities. The New

York Fed moves about 30% of Fedwire's total funds volume and about 75% of the total securities volume, Sendrovic said. This requires 150,000 transactions each minute.

Fedwire runs on one of the New York Fed's three IBM System/370 series mainframes in the bank's New York data center. The second mainframe is used for all non-Fedwire bank business, and the third resides at the hot site in Pearl River, N.Y.

Given the importance of Fedwire to the country's financial well-being, it was no small matter when the system crashed twice that week in 1987. Not only did the New York bank go down, but all the banks with which it did business found themselves ignorant of their exact financial positions.

On Sept. 30, 1987, the night of the second IMS database crash, "hordes of IBMers were at the bank," Sendrovic recalled. "The database was corrupted, and we closed that night at 3:45 a.m."

Although the bank did recover from those crashes, Sendrovic said, that week prompted some

of his colleagues at the bank to question his approach to providing 100% availability. Since about 1986, the bank had been trying to decide on the best method for ensuring no downtime. One faction argued that it would be best to start from scratch and redevelop Fedwire on fault-tolerant hardware.



**New York Fed's Sendrovic aims for 100% uptime**

However, Sendrovic did not like that idea. "We didn't need fault-tolerant hardware because hardware is the component that crashes least often," he said. "We needed a fault-tolerant system, and this includes everything — environmental software, people, procedures and utilities." Sendrovic's philosophy, and the one that ultimately prevailed, was to slowly build up fault-tolerant capabilities throughout the bank's information processing network.

His approach has apparently worked. The New York Fed improved its funds-transfer uptime from 97.2% in 1987 to 99.98% in 1990, although the recent figure does not include 2½ hours downtime from the blackout.

To get to this point, the bank focused on educating both man-

agement and users, identifying the single points of failure and buying backups of certain items, such as network controllers. It also automated the operations side as much as possible.

Further, Sendrovic said, seven of the nine crashes in 1987 were caused at least partly because the bank was behind in its software releases — especially in the MVS operating system and IMS. Now, the bank makes sure it is using the most recent releases within six months of their availability. Maintenance changes and updates are made only once per month and tested both individually and as a group before being put on-line.

The bank has also implemented IBM's Extended Recovery Facility, which automatically switches applications in one mainframe to a connected mainframe in the event of a failure.

The New York Fed also reduced the amount of time it needed to recover at the hot site from six hours to one. The Fedwire database is re-created and sent four times each day to the hot-site facility.

All this paid off during the blackout last August, when one of the bank's generators failed. After getting the OK to go ahead with the hot site, Sendrovic said, his team had everything running in about 40 minutes.

"I was very grateful that things worked like we said they would," Sendrovic said. "But if the week in 1987 was a 10 on a scale from one to 10, the blackout was a minus two."

Unisys begins building  
on OLTP architecture

BY ELLIS BOOKER  
CW STAFF

BLUE BELL, Pa. — Last October, when Unisys Corp. issued its systems architecture blueprint, it said a major pillar of the scheme — as well as the company's future — would be on-line transaction processing (OLTP).

Two weeks ago, Unisys uncrated the first pieces of furniture for this OLTP house, announcing new processors and software products, including an enhanced version of AT&T's Unix transaction monitor, to support its trademarked Unix/OLTP offering.

The three new systems — U 6000/65, U 6000/75 and U 6000/85 — use the Intel Corp. i486 microprocessor, run AT&T Unix System V Release 4 and are binary compatible with existing U 6000 machines introduced in 1988.

The high-end U 6000/85, like the existing U 6000/75, is built by Sequent Computer Systems, Inc., can have up to 30 proces-

sors and supports 1,000 users.

Unisys officials deflected the idea that powerful Unix servers, which can run the same fourth-generation languages (4GL) as Unisys mainframes, would become an inevitable migration path for mainframe customers. They emphasized that the client/server architecture outlined in October calls for three tiers, the top being the "information hub," typically a mainframe.

Analysts see things a bit differently, however.

"In the long run, Unisys is hoping for [migration]," said David Card, director of systems research at International Data Corp. in Framingham, Mass., who praised Unisys for doing a good job of adding features to its mainframes to keep them above the Unix line.

John Dunkle, president of Workgroup Technologies, Inc. in Hampton, N.H., said Unisys is traveling, albeit more slowly, along the path already traveled by NCR Corp. "They're faced with trying to standardize on a

single architecture," he said.

At the same time, some Unisys users sided with their vendor. "Today, you don't run mainframe applications as you did 10 years ago," said Ernst & Young's national director of MIS, George J. Germann.

In Germann's shop, a network of about 1,500 Unisys personal computers work on Novell, Inc. networks; the corporate mainframe in Lyndhurst, N.J., nightly grabs the data from these networks for processing. "We see the corporate mainframe holding the 4GL, with the transaction processing distributed."

Making Unix hardly enough for OLTP, and eventually for distributed OLTP, was clearly a top priority for Unisys. Unisys' answer was an enhanced version of AT&T's Tuxedo Transaction Monitor and what it called the industry's first OLTP database to use the XA protocol. The protocol, from X/Open Consortium Ltd., specifies a standard interface between the transaction monitor and multiple distributed database management systems in an OLTP setting.

Unisys and Menlo Park, Calif.-based Informix Software, Inc. said the result of their joint effort would be an XA-compliant version of Informix-Online.

The three additions to the Unisys U 6000 line are all multiprocessor systems, the first for the line. They are priced between \$36,000 and \$214,000.

One of Unisys' largest U 6000 users, K Mart Corp., plans to upgrade its platforms to the multiprocessor option as soon as

**T**ODAY, YOU don't run mainframe applications as you did 10 years ago."

GEORGE J. GERMANN  
ERNST & YOUNG

possible. Two years ago, the Troy, Mich., retailer signed up for what was then the top-of-the-line Unisys Unix box, the i486-based U 6000/60.

"We will upgrade to the 65s over the next year or so, and by the end of '91 will have 800 machines in," said David M. Carlson, senior vice president of corporate information systems.

Carlson said the upgrade means the systems will be able to grow by adding processors as they are needed.



# Uniface serves up A la Carte query product

BY JEAN S. BOZMAN  
CW STAFF

ALAMEDA, Calif. — Uniface Corp. is allowing end users to take home a side order of its database-server application development system with a client-oriented query product called A la Carte.

The front-end report writer, introduced recently, gives users the option of substituting a what-you-see-is-what-you-get environment of pop-up menus under Open Software Foundation's Motif interface for a character-based Uniface interface designed by corporate information systems programmers.

It supports the same relational database management system products as the standard Uniface applications-development programming package. The existing Uniface supports RDBMS packages including those from Oracle Corp., Sybase, Inc. and Ask Computer Systems, Inc.

Uniface, a 4-year-old Amsterdam-based firm, has 175 employees, 30 of them in the U.S.

## Cost cutting

Copies of A la Carte may run against remote copies of Uniface software running on remote data servers. However, users

must still have access to at least one system running Uniface's layered fourth-generation language software.

"As long as you go through a Uniface data dictionary on the remote machine, you don't have to have Uniface on the client machine," said Anu Shukla, Uniface's vice president of marketing. Thus, start-up costs for existing Uniface customers would be substantially less than for new A la Carte users, who would need to buy some Uniface products.

One Uniface customer said he planned to integrate the A la Carte package with an existing Uniface applications generator and a Sybase RDBMS. "This will allow

me to design end-user applications that run against multiple RDBMSs," said Larry Laux, president of Milwaukee-based MCSS, Inc., which sells Hewlett-Packard Co.-based data servers to systems vendors to track customer support and maintenance services.

## A la Carte menu

A la Carte runs under MS-DOS, OS/2, Digital Equipment Corp.'s VMS and Ultrix, Stratus Computer, Inc.'s VOS and various versions of Unix. Future releases may support other operating systems, Shukla said.

Prices for the reporting tool range from \$800 for an MS-DOS desktop version to \$40,000 for a DEC Vaxcluster version, she said.

# Imaging goes to press for start-up

BY CAROL HILDEBRAND  
CW STAFF

HUDSON, N.H. — Deciding that market opportunity beats out a slingshot, David joined hands with Goliath in the press industry.

The tiny firm, Presstek, Inc., has signed a 20-year licensing agreement with Heidelberg Druckmaschinen A.G., the largest manufacturer of printing presses worldwide, for Presstek's direct-to-plate imaging technology.

The proprietary technology takes the bit-mapped image of an electronically composed Adobe Systems, Inc. Postscript-produced page and images it directly onto special waterless plates on a printing press. This results in plates that are already aligned and in register, eliminating costly press preparation time. It also eliminates many of the intermediate steps necessary to produce color plates in conventional printing and electronically adjusts ink keys.

Presstek's imaging technology will be incorporated into Heidelberg's GTO line of presses, with the first, the GTO-DI, aimed at exploiting the short-run color printing market.

According to Frank Romano, editor of "Typeworld," a newsletter on electronic publishing, there is a void of cost-effective answers for people seeking between 500 and 5,000 copies of a brochure, for example. "Conventional printers want you to do 10,000 or more, and color copiers are limited in quality and speed," he said. He estimated that 65% of electronically formatted pages fall into this category.

Romano also said he expects a lot of switching from black and white as a result of the direct-to-plate imaging. "It allows them to get color at almost black-and-white rates," he said. "It's a whole hidden market out there."

However, some industry observers said Presstek needs to do some fine-tuning. Peter Dyson, editor of "The Seybold Report on Publishing Systems," questioned the amount of time it takes — 20 minutes — to image a plate on the press. With press time an expensive commodity, "you might be better off taking the hit on the setup time," he said, referring to the steps needed to prepare conventional printing plates. "What Presstek needs to do is cut down on the amount of time it takes to burn a plate," he said.

# Are Your DBAs Being



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## NEW DEALS

## DEC sells to Asian firm

Digital Equipment Corp. sold a VAX 9000 to South Korean securities firm **Dongnam Securities Co.**, its sixth mainframe sale to an Asian firm. Combined with a fault-tolerant VAXft system, Decserver terminals and other DEC products, the contract is worth \$3 million. The VAX 9000 Model 210 will handle Dongnam's customer accounts, investment information, integrated branch management network and trading and portfolio management systems.

**Hitachi Data Systems Corp.** won an EX 90 mainframe contract from the **Port of Singapore Authority**. The authority will upgrade from a Hitachi EX 50. The mainframe, the largest commercial processor in Singapore, will accom-

modate the growing Portnet system, which is expected to link 876 users and 1,290 personal computers by year's end.

**Amex Canada**, a division of American Express International, licensed \$2 million worth of integrated banking applications from **Hogan Systems, Inc.** The system will allow Amex Canada to begin offering banking services to its 2 million merchant customers this year. Hogan also announced software license agreements totaling \$4.25 million with four international financial institutions.

**Cray Research, Inc.** sold a Y-MP2E research supercomputer to Netherlands service bureau **Informatica Centrum Voor Infrastructuur en Milieu**. The bureau will use the Cray for monitoring and forecasting the effects of transportation on the environment and analyzing and predicting changes in waterways and coastlines.

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## HP updates its MPE/XL

BY J. A. SAVAGE  
CW STAFF

CUPERTINO, Calif. — Hewlett-Packard Co. will continue to enhance its proprietary operating systems with 25 additions to be announced at the end of next month. MPE/XL Release 3.0 adds functions for systems management, database management and client/server services, according to the company.

In systems management, HP will add seven enhancements, including management through Openview on either personal computers or an HP 3000 minicomputer monitor. "Anyone on a network can open up a console window," said Richard Sevcik, general manager at HP's Commercial Systems Division. Also included will be recovery software that will switch users to another HP 3000 system while recovering user data.

In database management, the new operating system will add five enhancements, including connections with its database, Allbase/SQL, and development tools such as those from Ingres Corp. and Information Builders, Inc.

Finally, MPE/XL 3.0 client/server enhancements include support of X Window System and will allow migration from PC-based servers by supporting Novell, Inc.'s Portable Network.

## Savage

CONTINUED FROM PAGE 27

based on Intel's 80386 and I486 architecture. Still, it's not much of a future market on which vendors can hang their profits and not much of a future applications growth path for users, either.

Still, it's one thing to preach to the choir and another to convert disbelievers. Sequent believes it can increase its business 15% by adding Pick applications, and at least one analyst organization concurs. Gartner Group/Infocorp says the Pick market will more than double in the next few years, from \$1.63 billion to \$3.4 billion by 1994.

Stop me if I'm wrong, but I don't think that many college graduates are leaving with Pick experience. In addition, how many salespeople have the background to sell Pick? Sequent officials acknowledge that they have to take Unix people and train them.

While I don't doubt that Pick facilitates database management and some business applications, it seems to be scattering the focus of new users. Just when Unix applications appear to be the thing on which to concentrate, a few vendors are throwing Pick/Unix at users. Perhaps once Unix settles down into one or two or three basic strains (AT&T System V Version 4 and the Open Software Foundation's OSF/1), then it will be time to confuse users with Pick on top of it all. But until then, vendors should spend their time getting their Unix act together. Users have been waiting entirely too long for it.

Savage is a *Computerworld* West Coast senior correspondent.



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**David V. Evans**  
Vice President  
Director, Information Systems  
J.C. Penney



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**Mark Quinlan**  
Senior Programmer/Analyst  
Huntington National Bank



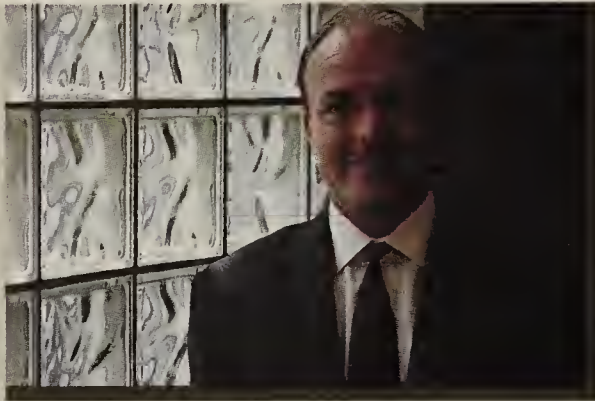
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**Paul R. Hessinger**  
Chief Technology Officer  
Computer Task Group



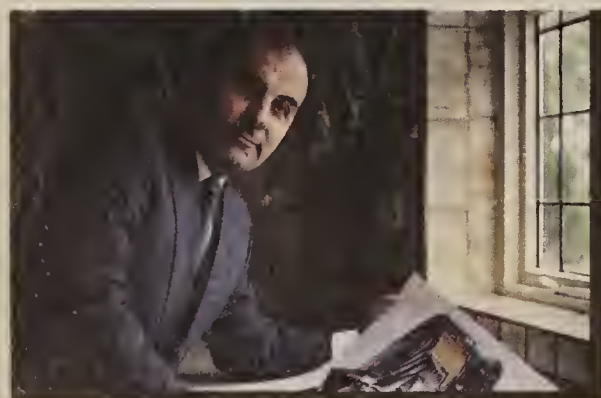
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"Our first IEF system was completed faster, and with fewer errors, than any system I've ever seen. If I had to go back to the old ways, I'd find another job...outside the DP world. It means that much to me."

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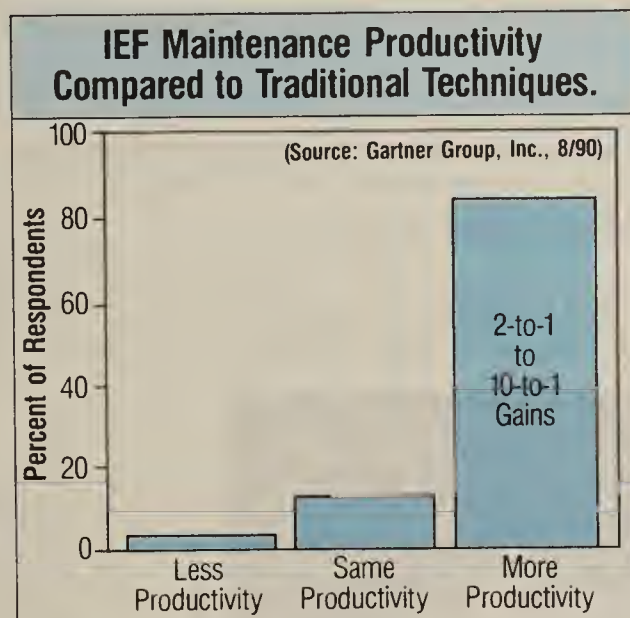
The quality of IEF-developed systems is remarkable. In recent CASE research by The Gartner Group, application developers were asked to report the number of abends they had experienced. (An "abend" is a system failure or "lock-up" caused by code defects.) IEF developers reported zero defects—not one abend had occurred in IEF-generated code.

### Maintenance productivity gains of up to 10-to-1.

In this same study, developers were asked to compare IEF maintenance productivity with their former methods. Of those responding, more than 80 percent had experienced gains of from 2-to-1 to 10-to-1. (See chart.)

### Specifications always match the executing application.

With the IEF, application changes are made to diagrams, not code. So, for the life of your system, specifications will always match the executing application. The Gartner Group research showed that *all* IEF users who reported making application changes made *all* changes at the diagram level.



Developers were asked to compare IEF maintenance to former methods. Of those responding, more than 80% reported productivity gains of from 2-to-1 to 10-to-1.

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The IEF has generated applications for IBM mainframe environments (MVS/DB2 under TSO, IMS/DC, and CICS) since early 1988. Soon you'll be able to develop systems in OS/2 and then automatically generate for other platforms. DEC/VMS, TANDEM and UNIX are scheduled for availability in 1991. More will

follow. We are committed to increased environmental independence in support of the Open Systems concept.

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Of course, our technical support, consultancy, training courses, satellite seminars, and other informational assistance will continue apace. We also offer re-engineering and template services. This full-service support will remain an integral part of the IEF product.

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**Or write Texas Instruments, 6550 Chase Oaks Blvd., Plano, Texas 75023.**

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## NEW PRODUCTS — SOFTWARE

## Development tools

Software AG of North America, Inc. has announced a version of its application generation system that includes object-oriented design techniques.

Natural Construct Version 3.1 features object-oriented design capabilities that allow several tables or files to be used during the creation and maintenance of complex data structures. Program, statement and model creation elements are also included.

License fees range from \$9,000 to \$77,800, depending on type of platform and operating system.

**Software AG**  
11190 Sunrise Valley Drive  
Reston, Va. 22091  
(703) 860-5050

Sun Microsystems, Inc. has announced a tool kit that allows users to design what-you-see-is-what-you-get applications that also use Unix System Laboratories, Inc.'s Open Look graphical user interface.

The News Toolkit was designed for creating applications on Unix systems within Sun's Open Windows application development environment.

A user license for the News Toolkit is bundled with all Sun Sparcstations. The product can also be purchased separately

for \$295, including media and documentation.

**Sun Microsystems**  
2550 Garcia Ave.  
Mountain View, Calif. 94043  
(415) 960-1300

## Applications packages

Stalwart System Concepts of Canada, Inc. has announced that its Stalwart Object Administrator software package now runs on IBM Application System/400s.

The product includes user-defined object types, multiple security levels for each user and up to 999 development cycle stages.

The software package is priced at \$14,583.

**Stalwart System Concepts**  
P.O. Box 899  
Station J  
Calgary, Alberta T2A 6A6  
(403) 237-5528

UIS, Inc. has announced Version 2.1 of UIS-Manager (formerly called V-X Manager), its Digital Equipment Corp. VAX data center management system.

UIS-Manager automates user authorization, system reporting and backups. This results in reducing VMS training time and requirements, according to the company.

Version 2.1 offers enhanced VMS monitoring and an upgraded user-defined privilege coding scheme. It also includes DEC's License Management Facility.

Pricing ranges from \$2,600 to \$21,000, depending on system size.

UIS has also announced a new version of UIS-PACS (formerly V-X PACS), a resource accounting and chargeback software package. UIS-PACS Version 2.1 allows incorporation of non-VMS resource data and adds a holiday accounting option and a zero-based accounting feature for budget allocation based on resource use.

The product is priced from \$3,400 to \$30,000.

**UIS**  
420 Bedford St.  
Lexington, Mass. 02173  
(617) 861-6262

## HARDWARE

## Data storage

Optimem, an Archive Corp. subsidiary company, and Kom, Inc. have announced that 3.9G bytes of write-once read-many (WORM) optical storage is now available for Digital Equipment Corp. and Sun Microsystems, Inc. computers.

Kom's Optifile II (\$5,000) software package has been merged with Optimem's 4400 WORM optical disc drive. The 12-in. drive can be installed on DEC VMS-based Q-bus and Unibus machines or on Sun Sparcstation and Sparcserver systems running under SunOS.

Optifile II lets Optimem's 4400 drive be intermixed with other optical drives to provide additional storage capacity.

The bundled package is priced at \$22,300.

**Optimem**  
297 N. Bernardo Ave.  
Mountain View, Calif. 94043  
(415) 961-1800

Micro Technology, Inc. has announced two Storage Disk Interface-compatible removable storage systems that were designed for Digital Equipment Corp. VAX machines.

The MDI-120R (\$42,000) and MDI-79R (\$24,680) both feature data transfer rates of 2.8M byte/sec., and both can be configured as dual-drive systems.

The MDI-120R is also equipped with 1.2G bytes of formatted storage capacity, the company said.

The MDI-79R features an average seek time of 20.4 msec and can reportedly generate more than 50 I/Os per second.

Dual-drive versions are priced at \$42,000 and \$72,000, depending on model.

**Micro Technology**  
5065 E. Hunter Ave.  
Anaheim, Calif. 92807  
(714) 970-0300

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# PCs & WORKSTATIONS

## COMMENTARY

Richard Pastore

### Mixed signals from Compaq



What is Compaq doing in this Advanced Computing Environment (ACE) alliance? Is it favoring RISC over the Intel architecture? Is it gunning for high-powered users over the corporate desktop set? Have thousands of Systempro users bought into the wrong high-end solution? To hear Compaq tell it, the answer is yes and no. And maybe.

One thing is clear, however: Compaq is very serious about ACE and is putting its money and its mouth into the project. Chief Executive Officer Rod Canion stood up in front of hundreds of skeptical reporters and analysts at the announcement and promised it will be the "predominant system for advanced computing within this decade."

For current Compaq users, the signals are mixed. The vendor says it will remain "strongly committed" to the future Intel product line. But one has to wonder if the old-fashioned Intel 80386 and I486 will command much of Compaq's attention during the next 18 months.

Case in point: Compaq admits it is getting harder to differentiate the Intel-based desktop PC. The company's accustomed

*Continued on page 40*

## Hollywood to make its VDT screen debut

BY CAROL HILDEBRAND  
CW STAFF

Not content with its staid Blue image, IBM went to Tinseltown to find inspiration for its entry into the presentation graphics market.

With Hollywood, a Microsoft Corp. Windows-based package from IBM's Desktop Software Business Unit in Milford, Conn., the company takes aim at such packages as Microsoft's Powerpoint and Aldus Corp.'s Persuasion.

IBM has also acquired the rights to develop a version of OS/2 Presentation Manager from Hollywood's developer, Publishing Solutions, Inc. in Marlboro, Mass.

### Variety of methods

Hollywood allows several methods of creating presentations. Users can choose either a pre-designed, customizable template or an integrated outliner to put together a project. Text can be imported from word processors and spreadsheets.

Hollywood's Data Manager interface features a spreadsheet-like format that allows easy importation of the data and generation of charts and tables.

Sheldon Laube, national director of information and technology at beta-test user Price Waterhouse, said the outlining feature broadened the product's appeal. "It makes it relatively accessible for nongraphics professionals," he said. "You can do simple stuff easily, but it has a tremendous amount of further sophistication as you get in un-

der the covers."

Hollywood supports Speedo scalable fonts from Bitstream, Inc. and features a tool that allows shadowing, curving, mirroring and color washing of the text. It offers a wide array of chart types and a chart gallery in which a user can store frequently used chart types. A toolbox offers "drawers" of basic tools for such tasks as entering text, drawing and painting.

Kelley Anderson, a beta-test user at Deloitte & Touche in

Dallas, praised the ease of use for the unsophisticated user. Anderson, who is "not a power user," said, "It's intuitive to use. It comes up, you've got that toolbox, and it's easy to pick the type of activity you want, and you just go in and do it."

Anderson added that he also liked the ability to get into black and white quickly and output a presentation on a laser printer, which, he said, was a problem with other packages.

Laube said he found one

drawback: The package does not install on a network very well. "You pretty much have to have a copy of it on every machine," he said. "It takes up a lot of disk space." Laube added, however, that IBM is presently working on the problem.

Hollywood retails for \$495 and is slated for availability May 31. IBM announced toll-free live technical support for all IBM Desktop Software products. On-line support is available to Compuserve members.

## FEATURE: GRAPHICAL USER INTERFACES

### Keep them sleek and simple

BY CHRISTINE COMAFORD  
SPECIAL TO CW

The fact that a user interface is graphical doesn't automatically mean it's intuitive or easy to use. Consider this: According to Microsoft Corp., becoming accustomed to a graphical user interface (GUI) should require eight hours of training. However, in a study by Corporate Software, Inc., 14 firms reported that 20 to 30 hours of training was a more accurate estimate. Apparently, GUIs are not nearly as intuitive as their creators would like to think.

A "good" graphical user interface is straightforward in its presentation and easy to navigate. It uses its screen real estate well, is succinct and powerful and doesn't include unnecessary components.

A "bad" GUI is awkward, unclear and certainly not intuitive. The user is never sure what to do and never sure how to find his way to a desired action. Some GUIs give the user confidence; others don't.

Computer-fluent developers are often guilty of designing interfaces that are difficult to understand, assuming that users think and interact  
*To page 40*



Stuart Goldenberg

## MAY 1991

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
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5	6	7 Wilmington, DE	8	9 San Diego, CA	10	11
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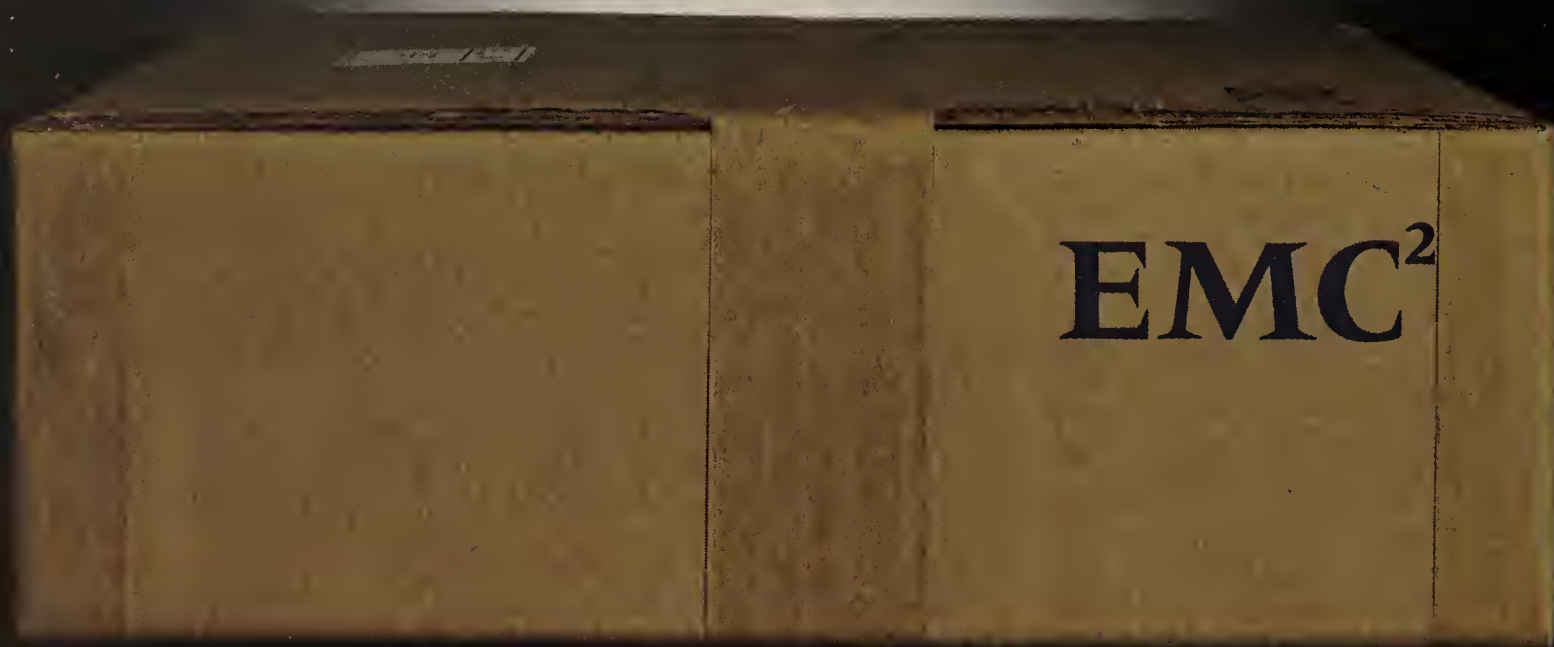
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# Paradox breaks new ground

While most in the software industry scramble to maintain their status, Borland International, Inc. has used technical acumen and aggressive marketing to grow at a rate reminiscent of the industry's boom years. Last week, the company announced 1991 revenue of \$226.8 million — 100% higher than a year earlier.

In recent years, Borland has claimed that its Quattro Pro spreadsheet has made great strides against entrenched rivals, while sales of language products such as Turbo Pascal, Turbo C and Turbo C++ also continued to soar.

Officials at the Scotts Valley, Calif.-based firm now have high hopes for the upcoming Paradox for Windows, which features a new database engine architecture that allows applications to share data by snapping into a

common "object layer." In the current, character-based version of Paradox, such data exchange now requires traversing the Paradox database.

Microsoft Corp. and Ashton-Tate Corp. have both promised Windows-oriented databases, but the potentially lucrative Windows database market is still relatively untapped and serviced by such products as Superbase 4 from the smaller Precision Software, Inc.

Computerworld Senior Correspondent James Daly recently discussed with Borland Vice President and general manager Rob Dickerson the upcoming product and its importance.

## What are the advantages of the new architecture?

Data independence. We want our users to choose the kind of data they want and be consistent

with it. It's the ultimate open architecture. Plus, you're guaranteed that any data the engine maintains reserves the referential and domain integrity of the information.

## Will you extend that design to the character-based Paradox?

Nothing technically prevents us, but right now we're maniacally chasing after getting these Windows products out the door. We're not saying you won't see it on DOS, but we're not working on it right now.

## Do you think those who use character-based Paradox will feel left behind?

That's going to be a fundamental question during the DOS-to-Windows [transition]. As a vendor, we're always thinking about into which basket we should put our eggs. We've chosen to make Paradox for Windows the killer application, because we see a real opportunity for us there.

## Borland has a tradition of announcing and shipping products on the same date. Why the sneak peek?

The biggest complaint we get is that we sometimes play our cards too close to the vest. We want our customers to know what our objectives are. We want to show people where we're going, so developers don't feel they've been abandoned.

## Speaking of where you're going, what is the Borland commitment to OS/2?

We focused on Windows before OS/2 because it's more commercially significant near term. We know how to build OS/2 applications — Sidekick OS/2 is bundled with an operating system from IBM — but we're not doing anything stupid in terms of not being able to move Windows applications to OS/2.

## With OS/2's future up in the air, does "not doing

## anything stupid" mean not doing anything at all for OS/2?

No. We're just not doing anything under Windows that makes the code nonportable to OS/2. But at this time, we are not building Paradox for OS/2.

## How about Unix?

We're not building Paradox for Unix right now. We support broad connectivity rather than a cross-platform strategy. Vendors that choose a single-platform focus strategy usually win, because they know how to take advantage of that platform. Compare Borland with Ashton-

Tate, which is building a flavor of Dbase IV for virtually everything that runs on electricity. As a result, they've got so many code bases, it makes it very difficult to evolve the product. We're building a broad range of applications on a narrower range of platforms.



Dickerson is pursuing a place in the Windows market

## What are Borland's greatest challenges in the next two or three years?

Winning on Windows. Using the transition to Windows as an opportunity to grab big pieces of market share, and giving customers products the competition doesn't have. Paradox is a big part of that.

## Object of the game

While Borland continues to gain accolades and market momentum with its dizzying release schedule, there remains an unsung hero of the firm: object-oriented programming.

Chief Executive Officer Philippe Kahn is betting the company on the methodology, a visually oriented programming technique that slashes development time by supplanting rigid programming designs and commands with graphical icons.

Since Borland switched to an all object-oriented development program more than two years ago, the firm's release schedule has been the envy of the industry. It was object-oriented programming, after all, that allowed the release of the Quattro Pro Version 3.0 spreadsheet only five months after the product's previous edition.

Object-oriented technology also played a key role in the development of the upcoming Paradox for Windows. "If we didn't use object-oriented technology, the program would take more than 100 engineers to build, and that's unmanageable," Kahn said.

The increasing complexity of writing software will require firms to standardize on object-oriented programming, he added.

JAMES DALY



Borland's Kahn emphasizes object-oriented tools

## Intel plans AMD squeeze

BY MAURA J. HARRINGTON  
CW STAFF

SANTA CLARA, Calif. — As it has done in the past, Intel Corp. will probably use its marketing muscle to try to neutralize arch-rival Advanced Micro Devices, Inc.'s efforts to market its new AM386 clone microprocessor. Intel is expected to introduce a low-end I486 chip in a 386 price range this week.

Code-named the P23, Intel's new microprocessor chip will not include a floating-point coprocessor, according to analysts.

Though it will likely be marketed as a higher-end product than AMD's AM386 chip, the P23 would be similar to AMD's new AM386 because both chips would run 32-bit software applications at only slightly different clock speeds, analysts said.

Intel's effort to overshadow AMD's new chip is not in vain, according to semiconductor analyst Millard Phelps at Hambrecht & Quist, Inc., an investment firm in San Francisco.

Some major differences in the components of a 486 chip might make the P23 more attractive than AMD's 40-MHz AM386

clone, if the price/performance ratio is right, Phelps said. Intel was able to place cache memory inside its new chip, for example.

AMD was the first to clone Intel's 80286 microprocessor (in 1988) but took a reduction in profit margins on sales of the 16-bit chip after Intel introduced the 32-bit 80386SX chip, which it priced competitively with AMD's AM286 chip to drive it out of the market.

Semiconductor analyst Michael Slater, publisher of trade journal "The Microprocessor Report," said he agrees that Intel may attempt to tarnish AMD's competitive efforts with its marketing clout and product introduction. However, he said it will not be easy this time for the chip vendor to succeed.

"This is a price/performance issue . . . where Intel is essentially saying, 'Here's a way to get the same performance on a higher level machine for the same price as the lower level [386 chip],' " Slater said.

He added that Intel will probably sell its low-end I486SX-type product for just slightly more than the Intel 386 chip costs.

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## Sleek and simple

CONTINUED FROM PAGE 37

with computers the same way they do. They are often quite unaware of how much prior knowledge goes into their understanding of what appears on the screen and are unable to grasp the requirements of users who lack that background. This is frequently compounded by failure to solicit user feedback or get help from human factors specialists.

The current definition of IBM's Common User Access (CUA) is quite limited and rarely helpful when designing and predicting how users will interact with software. In response, a growing number of applications are using "nonstandard" interface components such as status and tool bars, utility "ribbons" and file caches. The more users embrace these new interface components, the more they become de facto standards.

Because of such emerging standards, it is critical for developers to keep up with new GUI applications. Observe them objectively — try, if you can, to mimic the mind-set of the naive end user. What functions can you use and understand before picking up the manual or asking questions? Try to apply the most successful structures to your software's tasks. This is not a question of copying the look and feel of a competitive product but of applying successful design principles to your own work.

• **Know your users.** Build on paradigms users encounter in their daily life and thus are familiar with. Test the icons you are thinking of using: Find out if most users understand that the little striped squarish shape represents an open book.

Don't assume that users are like you. Have someone sit in front of your application and try to figure out how to interact with it. Be humble enough to gauge hon-

estly how the users react and solicit their input for making interface changes. Provide default options in all fields and make sure sufficient attention is given to context-sensitive Help.

Users rarely fall into one broad class. Assume they will fall into a number of categories and allow the interface to be extendable. GUI design for general-purpose corporate applications should be based on three categories of users:

1. Data entry/transaction processing. These applications should be geared toward high-turnover staff and must re-

### GUI guide

The following are the eight essential steps to designing an easy-to-use GUI:

- Know your users.
- Make frequent tasks easy.
- Adapt to users' work patterns.
- Consider multiple skill levels.
- Provide navigation help.
- Be consistent.
- Don't rely on users reading the manual.
- Don't get too cute.

quire minimal training. They will be keyboard-intensive, so you should provide menu accelerators and expect minimal, if any, use of mice.

2. Decision support. These should be geared to professionals with minimal time for training. They will be mouse-intensive, but don't overlook keyboard-intensive laptop use.

3. Systems administration. These should be geared toward technical staff who need more information for operating system, network and database management system administration. They will

use both mice and keyboards.

• **Make the things done most frequently the easiest.** Actions performed most often should require a minimal number of keystrokes, and menu selections should be at or near the top of the menu hierarchy. For example, changing character attributes in a word processor is common. Don't make users step through multiple menu levels for something so basic.

• **Adapt the interface to users' work patterns.** The interface should be customizable at some level. A good example of this is the ability to add menu items to Microsoft's Word for Windows by using macros. This idea is very powerful in light of the need to know your users. A corporation's end-user computing group could provide custom menus for each user category.

• **Consider multiple skill levels.** Both occasional and sophisticated users should be accommodated. Provide an option to display advanced features if desired by the user. A good example of this is Word for Windows Long Menus option. This feature enables power users to work at their own speed and does not confuse inexperienced users by displaying too many choices that they wouldn't need anyway.

• **Provide navigation assistance.** It is essential to design GUI applications with the inexperienced user in mind, to avoid providing too many options at the highest level and causing user paralysis. Grouping related menu items together also significantly reduces navigation confusion. Avoid modes in which a user's actions will be restricted and, worse yet, in which the user will have to figure out how to return to the default state of the application.

• **Be consistent.** CUA emphasizes consistency over clarity and ease of use. Follow the basics of CUA in order to be consistent with shrink-wrapped products, but when in doubt, opt for clarity and us-

ability. In menus and on buttons, use words that are common in the industry (File, Edit, Help and so on) or are understood and accepted within your firm.

Don't overlook formally designing the interface and having users review it before starting to code. Audit your interface design against other in-house or shrink-wrapped applications. Is it consistent? It should look and feel like other CUA-compliant applications, or it will require additional user training and may not integrate well with other applications.

• **Don't require the user to refer to a manual.** Basic functionality of the application should be easily understood. Display as much of the application's functionality as possible without cluttering the screen. Tool bars and utility "ribbons" are helpful in graphically portraying product features, assuming the icons are properly designed.

• **Don't get too cute.** Use graphics to provide visual metaphors to give users a familiar operating environment. Avoid the temptation of cluttering limited screen real estate with unnecessary icons, for example. Strive for a "WYSIWYNTS" interface — what you see is what you need to see — nothing more, nothing less.

Tomorrow's users will be increasingly more sophisticated and demanding. To design successful GUIs, developers need to do just that — really design them. That's not always easy, and chances are good that you will have to make trade-offs, given the fast-paced world of software development. But bear in mind that the benefits of doing it cleanly the first time will show up — fast.

*Alex Ward, senior technical consultant at Kuvera Associates, Inc., contributed to this article.*

Comaford is a partner in Kuvera Associates, Inc. with offices in Redmond, Wash., and Sausalito, Calif.

## Pastore

CONTINUED FROM PAGE 37

high profit margins depend on differentiation. The last thing it wants to do is peddle commodity boxes. So the PC maker is turning to the sexy, underexposed world of RISC and is apparently concentrating a great deal of development effort there.

Indeed, chief engineer Gary Stimac has been cloistered away for several months on this project. Other than the notebook LTE 386S/20, what exciting Intel product has come out of Compaq dur-

ing that time?

The Houston PC maker certainly isn't planning to dump the corporate market in favor of partner Silicon Graphics' scientific and engineering user base. The bucks and the volume still lie in the corporate environment.

Apparently, Compaq thinks high-end corporate users are increasingly fixated on the possibilities of RISC architecture. They perceive RISC as a faster, more robust architecture and development platform, according to Lorie Strong, Compaq's vice president of marketing. Compaq is doing ACE partly based on that perception, she said.

In actuality, the Compaq brain trust says it expects Intel and the Mips Computer Systems' RISC chip to seesaw as the dominant power platform. The firm will offer dual architectures until one earns market dominance.

So, how is a user supposed to determine which architecture to buy from Compaq in 1992?

Compaq says it is not sure who would buy which architecture for what purpose. But presumably, users doing higher end, mission-critical work would opt for RISC — based on that perception of power superiority.

What then of Compaq's current high-end strategy: multiprocessor systems? Is the Systempro a dead end on the high end? Or was it intended only as a network server, despite Compaq's earlier claims that it could replace minicomputers?

Once more, Compaq says it is not sure of the fate of the Systempro. "If users are putting higher end applications on the network, we think they will be looking for more than two processors and greater storage," said Michael Clark, a Compaq engineering vice president.

The company is considering expanding the Systempro beyond the two-processor limit or building a Systempro-like box around future RISC processors. In any case, the Systempro as it now stands apparently will not be the answer after 1992.

One more thing Compaq says it is not sure of is distribution for the new RISC

systems. Many Systempro customers are already unhappy about having to buy mission-critical systems from traditional PC dealers, and even more are unhappy with the service the dealers provide. Users are quite unlikely to accept a whole new advanced RISC platform from the friendly neighborhood Businessland store.

**A**PPARENTLY, COMPAQ THINKS high-end corporate users are increasingly fixated on the possibilities of RISC architecture.

Compaq's new bedfellow, DEC, sells its RISC workstations directly. New partner Silicon Graphics sells its workstations directly. The PC maker has some obvious examples to follow if it chooses to do so. Indeed, the agreement with Silicon Graphics does not preclude it from distributing Compaq's products, according to Clark.

The next two years will tell Compaq customers what they will be able to buy and where they will be able to buy it. But why they should buy may be the toughest question to answer.

Pastore is a *Computerworld* senior writer.

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# R:Base 3.1 feature-filled but lacks speed

## Microrim, Inc.'s R:Base Version 3.1

Reviews	Ease of use	Data integrity	Multuser support	Performance	Application development	Documentation	Service & support	Value	Score
<i>Infoworld</i> 1/14/91	Very good	Good	Satisfactory	Poor	Very good	Very good	Satisfactory	Good	Great tool, but slow
<i>PC Week</i> 12/10/90	Satisfactory	Good	Good	Satisfactory	Satisfactory	NC	NC	NC	Best integrity
<i>PC Computing</i> 2/91	Smoother	NC	A strength	Faster	NC	Good	NC	Good	A contender
<b>Users</b>									
Jim Sheehy, Superior National Insurance Co.	NC	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	Nothing can touch it
Bill Chivil, Putnam Berkly Group	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	Needs more speed
Charles Burns, CB Commercial	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	Phenomenal service
<b>Analysts</b>									
Dean Hiller, D. L. Hiller & Associates	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	Fair
Jerry Caron, Faulkner Microcomputer Reports	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	Good
Paul Litwin, Database Advisor	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	Solid, mature

Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey. NC: No comment Key: ■ Very good ■ Good ■ Fair ■ Poor

*Technology Analysis — A roundup of expert opinions about new products. Summary written by staff writer Derek Slater.*

Reviewers said Microrim's R:Base database management system is for sedan drivers: Its low-octane performance will frustrate speed lovers, but it is laden with luxurious features for querying, reporting and development.

Version 3.1 corrects a number of rough edges and performance problems that plagued R:Base 3.0, and Microrim offers free upgrades to registered users of that release.

**Ease of use:** R:Base is a user-friendly program, reviewers said. Queries and browser menus make data easily accessible. Users can operate either through menus or with a command line. A prompt-by-example function demonstrates the correct way to build commands. *PC/Computing* reported that Version 3.1 also handles printer problems more gracefully than its predecessor, warning the user instead of freezing the system. The installation procedure has been simplified and takes only 15 minutes, reviewers said.

**Data integrity:** Referential integrity in a multiple-table database is enforced by rules written specifically into that database rather than in the controlling code. As a result, reference rules can be very specifically customized. R:Base stands above its competitors in this area, according to *PC Week*.

**Multuser support:** R:Base offers good multuser features overall, reviewers found. However, there are a few notable limitations. All locking is at the table level; individual records cannot be locked. Users trying to view a locked table are sent to a wait queue, which aborts after a user-defined interval if the table does not become available.

**Performance:** Lack of speed is the foremost drawback for R:Base users.

## Vendor financial information

A 9-year-old company, Microrim, Inc. produces only the R:Base product line. Based in Bellevue, Wash., the company has 135 employees. It is run by CEO Jack Noonan, formerly at IBM, and by Founder and Chairman Wayne Erickson. The privately held company does not release financial data. Sales are reportedly in the \$20 million to \$25 million range.

The program straggled in well behind other databases in benchmark tests conducted by personal computer laboratories. However, as analyst Jeremiah Caron commented, "Its performance is poor relative to the others, but you don't have to sit around tapping your fingers."

On the plus side, Version 3.1 is slimmed down, running in as little as 450K bytes of memory.

**Applications development:** R:Base's powerful programming language and numerous tools provide an

excellent development environment. SQL commands can be integrated into R:Base applications, and a compiler is included. The debugging tools and editor are less impressive but still useful, according to reviewers.

**Documentation:** For Release 3.1, the documentation is reworked, including updated indexes. The manuals are thorough and clear. One manual explains the similarities and differences between R:Base and Ashton-Tate Corp.'s Dbase. R:Base has on-line Help as well.

**Service and support:** Support policies were recently revised. Microrim now offers several support options. Phone support, while still free, is no longer toll-free for all users. Technical information is still available for no charge through a bulletin board service and a fax program.

Reviewers found the phone support technicians to be fairly easy to reach and very knowledgeable.

**Value:** Reviewers said R:Base, priced at \$795, is a good value overall; it is best suited for users willing to sacrifice some speed for powerful features.

Microrim recently announced a new upgrade plan for R:Base called Upgrade Express. Users who enroll for a fee of \$129 per year (\$99 before April 30) will receive periodic enhancements throughout the year. The first Express extension includes a feature called the Dynamic Application Integrator, which gives users the ability to menu and run other applications (such as spreadsheets) from within R:Base.

A low-end version called Personal R:Base, without programmability and network support, is available for \$99.

## Microrim responds

*Comments from Mickey Friedman, director of product marketing:*

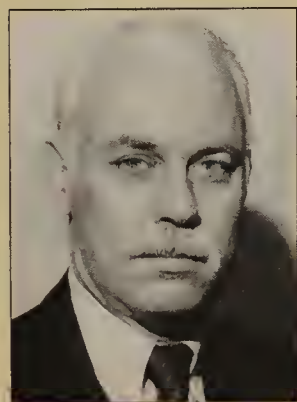
**Performance:** We have concentrated our performance enhancement efforts where our users need them most: queries by example, for instance. Upgrades will continue to enhance performance.

**Service and support:** Our purpose in changing support policies was to satisfy a broader range of needs. We offer three levels of service. The first level is free support to all R:Base users. Second is higher priority for \$99; that includes a toll-free number, faster response time and our 'R:Base Exchange' publication. The third level is consulting on application development, which costs either \$2 per minute or \$20 per call; or there is a value pack of 10 calls for \$149. This offers a level for any need or budget.

**Value:** Each release in Upgrade Express will be significant. There will be three upgrades per year, and we have general guidelines to follow for outlining quality updates, performance enhancements and so on.

## NEXT WEEK

► Dataease International, Inc.'s Dataease 4.2 offers no procedural programming language. Instead, the company emphasizes ease of use.



"AFTER FIVE YEARS of development and use, we remain convinced that no other environment could give us the capabilities provided by R:Base."

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Vice President, MIS  
Superior National Insurance Co.



# 28<sup>1/2</sup> V



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## Satellite firm automates sales force

BY ALAN J. RYAN  
CW STAFF

PLANO, Texas — Sales can get complicated in Timothy Flynn's business of selling satellite time, especially with a four-person sales team handling 24-hour operations, a tricky pricing strategy and customers who do not like to wait.

Flynn's company, Broadcast Satellite International, Inc. in Plano, buys thousands of hours of satellite time from various carriers and then resells that time in 15-minute increments to news and sports organizations, syndicated businesses and the like.

Flynn was working with various pricing structures because the channels were purchased from several carriers. Because he was dealing with every time zone in the world, he could get calls at any time of the night.

All that has been simplified with software from SBT Corp., which sells an accounting package that includes sales force automation modules.

Flynn purchased Database Executive Library two years ago because it was compatible with his Fox Software, Inc. Foxbase

database. Since then, he has added an on-line sales order program and a contact manager module.

Salespeople can now access data directly from laptops to check on the status of a client, what the client has ordered in the past and contact names at client companies. They can even conduct credit checks.

### Pricing benefits

More importantly, however, the company can now more accurately price the satellite time it sells, thus increasing profitability. On the old system, Flynn set one average price for all the channels on the satellite to avoid the complexity of pricing each one separately. His profits varied from channel to channel.

The SBT software allows him to plug in the varying prices for each channel. When the time is sold, the correct price automatically pops up on the screen.

The most important change sales-force automation software has brought about, however, is the ability to more easily maintain 24-hour operations.

"If someone calls in from Japan in the middle of the night and wants to buy satellite time im-

mediately, [an on-call representative] can sell it from home," Flynn says.

The salesperson can also alert customers to the status of the request and immediately give the confirmation number assigned by the satellite carrier.

Broadcast Satellite plans to add fax cards to its Zenith Data Systems laptops so they can close transactions even more quickly. "We are just beginning to see the benefits of that program, and that will be tremendous for us," Flynn said.

## HP unveils pocket computer

CORVALLIS, Ore. — Hewlett-Packard Co. will release a calculator-size computer this week, according to sources close to the company.

The 95LX will weigh 11 ounces and will come with 512K bytes of random-access memory, 1M byte of read-only memory (ROM) and a slot for flash-memory cards. The ROM will hold Lotus Development Corp.'s Lotus 1-2-3 Version 2.2 and MS-DOS. The 95LX will also include a built-in scheduler, memo-taker, address book and HP Ad-

vanced Financial Calculator. It is slated to retail for \$699.

HP will also bundle the machine with an infrared, cableless port, which will allow data transfer between 95LXs.

Sources said HP will also offer 95LX users automatic paging via Motorola, Inc.'s Electronic Mail Broadcast to a Roaming Computer technology by the end of 1991. It will include terminal emulation abilities for electronic mail retrieval and file retrieval, but it will not have a built-in modem.

### NEW DEALS

## Canadian agency enters into PC contract

The Canadian government has purchased a personal computer network contract worth up to \$45 million over three years. The Employment and Immigration Canada bureau is buying 8,000 **Acer America Corp.** PCs based on the **Intel Corp.** 80386 chip, as well as 8,000 **Acer IBM Video Graphics Array** monitors. Systems integrator **Mohawk Data Sciences Corp.** will supply and install the equipment.

**Everex Systems, Inc.** won a subcontractor role in the federal government's Department of Veterans' Affairs (VA) Nationwide Office

Automation contract. Everex will supply up to 15,000 **Intel Corp.** 80386SX and 80386DX-based PCs over six years to contractor **Lockeed Integration Solutions Co.**, which will install the systems in VA agencies.

**General Electric Information Services (GEIS)** awarded an \$8 million contract earlier this month to **Hewlett-Packard Co.** for workstations, servers, software development tools, system software and peripherals. GEIS will use the equipment as part of its information services business.



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## NEW PRODUCTS

**Software applications packages**

Applix, Inc. has announced Version 1.1 of Asterix, an open suite of applications packages designed for Unix workstations and X terminals.

The product includes word processing, a graphical spreadsheet, audio for voice annotation, color pixel editing and live links to third-party applications. The software also provides fax support via macros and adds interprocess communications capabilities to its extension language facility. A color pixel editor enables users to edit scanned-in, imported and Asterix-generated images pixel by pixel using a 64-color palette.

The product now runs on Sun Microsystems, Inc.'s Sun3, Hewlett-Packard Co.'s HP 9000 Model 300 workstations and Mips Computer Systems, Inc.'s RISC System workstations.

The product costs \$995, or \$665 for a version without spreadsheet capability.

**Applix**  
112 Turnpike Road  
Westboro, Mass. 01581  
(508) 870-0300

Computer Associates International, Inc. has begun shipping Accpacc Plus U.S. Payroll Version 6.0, an upgraded payroll processing software package.

The personal computer-based product adds the ability to distribute an employee's payroll expense to several departments in the same pay period. Other enhancements include an updated user interface, multiple time-card reuse capability and a workmen's compensation report.

The product is priced at \$795.

The company said it offers several lower priced options for upgrading from previous versions.

**CA**  
711 Stewart Ave.  
Garden City, N.Y. 11530  
(516) 227-3300

**Software utilities**

V Communications, Inc. has announced a Microsoft Corp. Windows 3.0-compatible version of its Intel Corp. 80386/486 DOS memory manager.

Memory Commander (\$100) can reportedly move terminate-and-stay-resident programs and device drivers into high memory while a system is being booted,

thereby creating more main memory for DOS-based applications that contain copious amounts of data.

When necessary, DOS users can break their 640K-byte memory barrier by equipping their environment with up to 900K bytes of contiguous memory, the vendor said.

**V Communications**  
4320 Stevens Creek Blvd.  
San Jose, Calif. 95128  
(408) 296-4224

Right On, a mouse utility designed by Fanfare Software, enables Microsoft Corp. Windows 3.0 users to create customized sets of button actions for each application they use.

The product allows a mouse's middle and right buttons to be programmed to perform special tasks for use during various applications.

The product costs \$50.

For a limited time, the company is including its screen cursor utility package, Magic Cursor, with Right On for \$79.95.

Magic Cursor requires less than 10K bytes of memory and can be purchased separately for \$49.95.

**Fanfare Software**  
9420 Reseda Blvd.  
Northridge, Calif. 91324  
(818) 886-8787

Central Point Software, Inc. has announced an antivirus software package designed for DOS, Microsoft Corp.'s Windows and networked environments.

Central Point Antivirus (\$129) detects, eliminates and prevents data corruption caused by more than 400 known and unknown viruses.

A file immunization feature makes executable files self-protecting, and a dialog box alerts Windows users of infections that occur while a Windows application is running.

The product includes Vsafe, which is a memory-resident utility that monitors systems for signs of a virus attempting to infect a file.

**Central Point Software**  
15220 N.W. Greenbrier Pkwy.  
Beaverton, Ore. 97006  
(503) 690-8090

**Database management systems**

Micro Data Base Systems, Inc. has released M/4 for Windows, a Microsoft Corp. Windows 3.0-compatible database management system.

The product incorporates a data dictionary, an interface for the company's Object/1 graphi-

cal development environment, a Microsoft C application programming interface and developers tools.

Available add-ons to M/4 include ad hoc query generation and interactive tools for database access.

The package is listed at \$995.  
**Micro Data Base Systems**  
Two Executive Drive  
Lafayette, Ind. 47902  
(317) 447-1122

Revelation Technologies, Inc. has announced Version 2.1 of Advanced Revelation, a relational database management system and application development environment for IBM Personal Computer ATs, Personal System/2s and compatibles.

The product's query-by-example feature acts as an intuitive front end for interactive relational queries, and its distributed indexing capability obviates the need for all transactions to pass through a single file, according to the vendor.

Advanced Revelation Version 2.1 lists for \$1,195.

Users of Version 2.0 can upgrade their systems for \$200; all other upgrades cost \$400.

**Revelation Technologies**  
Two Park Ave.  
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As a DECserver, Concert handles DEC LAT and Ethernet protocols while also paving the way for users of 3270 or asynchronous terminals and PCs to communicate with the IBM 370 or the DEC VAX.

Finally, as a remote 5394 controller, Concert talks simultaneously to one or more System 36, 38 or AS/400 hosts, while connecting up to 42 twinax devices.

IDEA designed the Concert controller as a modular communications platform, which means it easily migrates across host environments as needs change over time. On-site service is offered by IDEA Servcom.

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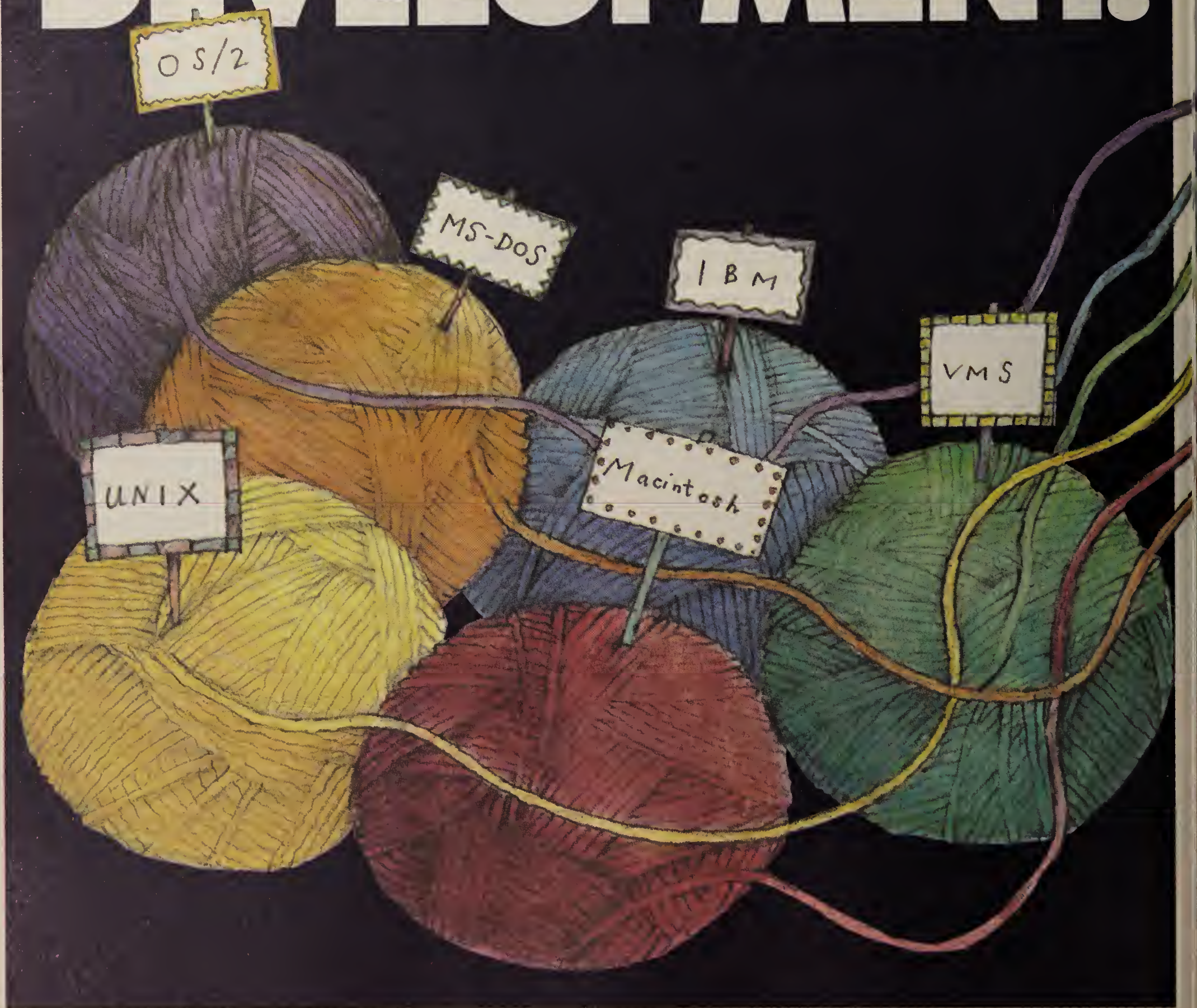
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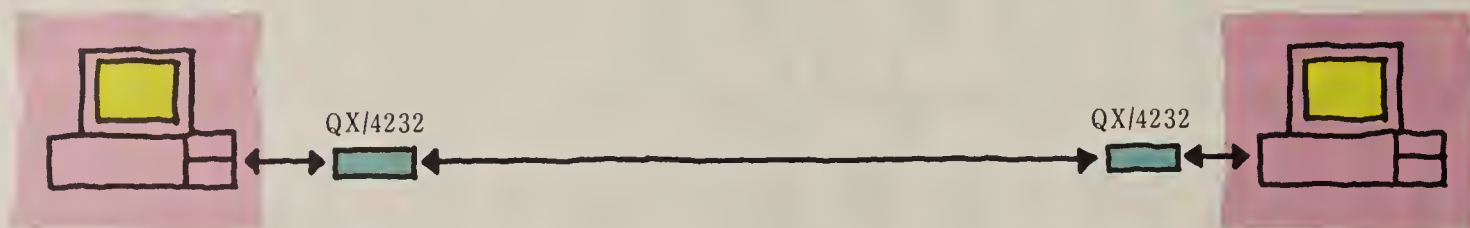
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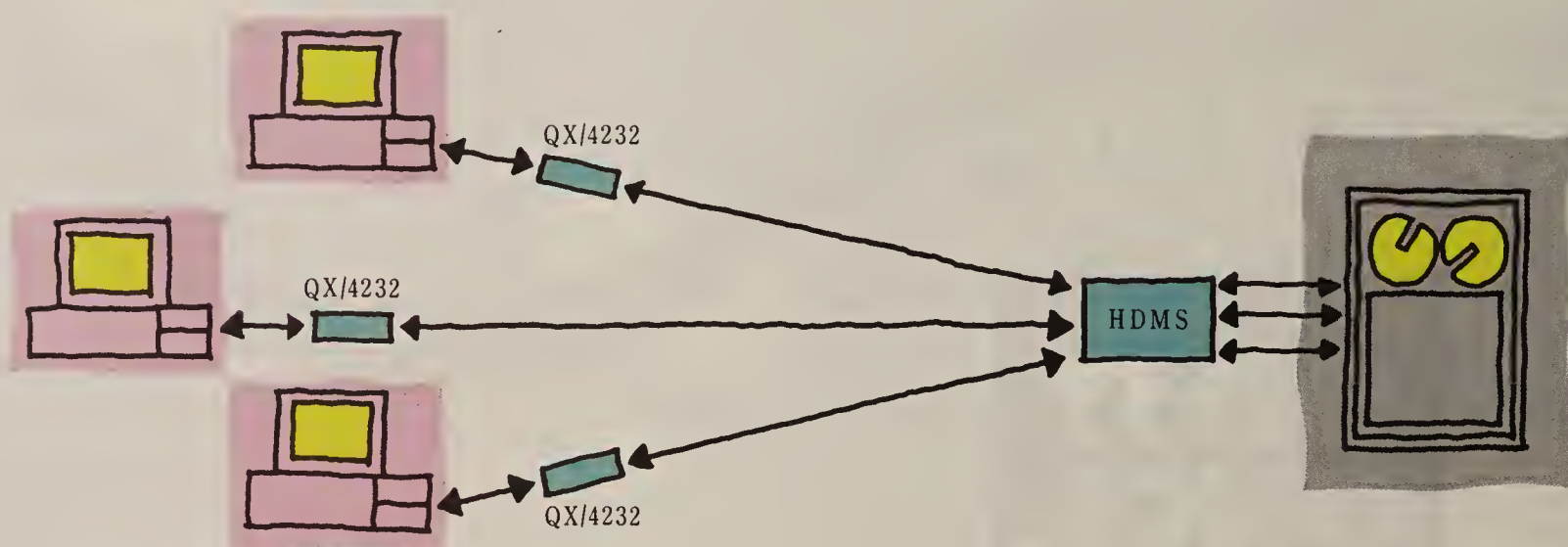
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## BIT BLAST

### Netool licensed

Multiplexer vendor **Timeplex, Inc.** and **Make Systems, Inc.** recently announced a worldwide agreement that will allow Timeplex to license a version of Make Systems' Netool decision support system. Netool allows users to preview the ramifications of new network configurations before making equipment and line installation decisions. Make Systems announced the Link version of Netool — along with a version for Newbridge Networks Corp.'s Mainstreet T1 multiplexers and 4602 network management systems — last September. Timeplex and Make Systems are reportedly jointly developing a system for importing network information from Timeplex's Time/view 2000 network management system to Netool.

**Anthem Electronics, Inc.** recently created a new manufacturing unit to handle existing and undisclosed new networking products. Anthem, based in San Jose, Calif., has an exclusive license to build and sell Novell, Inc. Ethernet adapter cards. The new unit, Eagle Technology, will take responsibility for that line. According to Anthem, which is rumored to be preparing to license Novell's Netware ELS work-group software, Eagle will offer unspecified new connectivity products.

**Unisys Corp.** recently enhanced a flurry of enhancements to its Network Applications Platform voice processing system, including fax services and voice messaging capabilities. The fax features include a fax mailbox, fax overflow, fax annotation and broadcasting. Voice messaging capabilities include password security, message retrieval, review and storage, paging, group mailboxes and message forwarding.

## Alliances get mixed reviews

*Banding of telephone companies may aid multinational corporations*

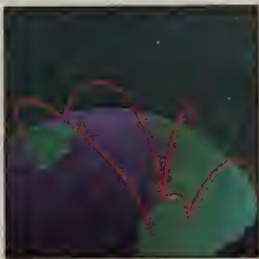
BY ELLIS BOOKER  
and JOANIE M. WEXLER  
CW STAFF

In this era of strategic vendor alliances, the world's telecommunications carriers are no exception. Many are banding together to provide one-stop global network shopping to multinational customers — with mixed reactions from the user community.

While users agreed that better coordination among the world's carriers is desirable, some said they have yet to be convinced that a carrier partnership will prove faster or more competent than their seasoned in-house networking staffs.

Bill Coopman, director of telecommunications at Deere & Co. in Moline, Ill., said that because his 11-country network is "not broken," he would be reluctant to hand over its design, planning and management to an independent entity.

Coopman, who is also vice president of the U.S. branch of the International Telecommunications Users Group (Intug), said the Intug jury is still out on the one-stop concept. Today, he explained, eliminating finger pointing in troubleshooting international circuits requires "you to simply sit down with the carriers and figure out whose problem it is."



How much better three or more carriers will do in resolving a customer problem is an open

question, he said.

Meanwhile, a multinational carrier alliance is working well for General Electric Co., according to Stanley Welland, manager of corporate telecommunications at GE. British Telecommunications PLC, AT&T, France Telecom and Japan's long-distance provider, Kokusai Denshin Denwa Co., have been providing a 40-country end-to-end network for GE since the spring of 1989.

Welland said that for GE, the approach has paid off — particularly in not having to employ telecommunications staff around the world.

"The three carriers know Europe; their relationships with the PTTs are better than ours," he added. "They help us build rapport with the other carriers and define what facilities we need and coordinate a smooth installation of those services."

### Day by day

Welland acknowledged, however, that the arrangement's success hinges on day-to-day involvement by GE. "I'm a great believer in outsourcing, but I'm also a great believer in participation," Welland said. GE runs a centralized network management base in Princeton, N.J., that interfaces with all the Postal Telephone and Telegraph (PTT) authorities. The firm is involved in the day-to-day troubleshooting of network problems.

"Communications today plays too vital a role to turn the whole thing over and cross your fingers," Welland said.

## Networking could spur DVI technology growth

BY JIM NASH  
CW STAFF

Proponents of digital video interactive (DVI) have said the multimedia-derived technology is waiting for a spark to set off rapid growth. That spark, they said, will be networking.

DVI, a technology that links audio, still-image, video and data in an interactive database, is already having an impact on employee training and product marketing. The problem is, it is often impractical to set up an entire system — including personal computer and videocassette or laser disc player — on an employee's desk.

The answer, early implementers of DVI said, is to centralize the data and distribute it over local-area networks. At Bethlehem Steel Corp. in Bethlehem, Pa., plans are under way to network its 18-month-old DVI system. Bethlehem Steel uses the system as an automated help desk and for desktop training.

Leon Murphy, manager of Bethlehem Steel's multimedia

applications team, said that with DVI, company managers are able to provide "just-in-time training," or training available almost as soon as the trainee needs it. But it still requires employees to have the proper

customers on how to use the steel maker's IBM mainframe connectivity application. The software allows users to link their IBM mainframes to Bethlehem Steel's mainframe and vice versa. In the next 36 months, Murphy said, 1,000 people will use the DVI system to learn how to use the linking application.

However, the spotlight right now is on a prototype project that would put lessons about that software and any other training

Murphy said. "We'll try to retrofit DVI onto what we have."

He said that DVI's digital nature should help to ease bandwidth problems on most media.

"I don't think DVI will take off, really, until it is on networks," said Reinhard Ziegler, senior manager at Andersen Consulting's Change Management Services Division in Dallas.

One DVI software vendor, Protocomm Corp. in Trevoise, Pa., has said it will ship a networking version of its Videocomm/NV product June 15. Videocomm/NV will support five workstations running on a Novell, Inc. Netware Version 3 file server. It is priced at \$3,800.

Ziegler said that Intel Corp. 80386-based 25-MHz DOS servers can handle DVI without bogging down. Better performance will arrive with DVI for Unix boxes early next year, he said.

In a way, DVI may be almost as good for networking as networking is for DVI, Murphy said.

Ziegler said Andersen Consulting is integrating networked DVI systems for several clients and is designing such a setup for its own use. The internal system, he said, should be operational in six weeks, but he would not elaborate.

### Departure time

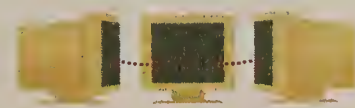
*Networking may be the force that makes digital video interactive (DVI) succeed*

### Networked DVI:

- Works on Intel Corp. 80386-based servers.
- No special cabling necessary.
- Microsoft Corp. Windows version expected this fall.

### DVI applications:

- Training and retraining program at employees' desks.
- On-line help desk with images to reduce confusion.
- On-line marketing of products, real estate and services.



CW Chart: Tom Monahan

equipment on their desks and to borrow compact disc/read-only memory (CD-ROM) discs to receive lessons.

Bethlehem Steel has designed a CD-ROM training program using DVI to educate employees as well as suppliers and

program onto Bethlehem Steel's growing PC network.

Bethlehem already is taking inventory of its estimated 20 local-area networks to see how DVI can be used on the existing Ethernet, Token Ring and fiber networks. "We're scavengers,"

## Potential partners

The most recent carrier alliance is a proposed partnering of British Telecommunications PLC, Japan's Nippon Telegraph & Telephone Corp. and Germany's Deutsche Bundespost. While details of the would-be alliance are sketchy, Wolfgang Huerter, a network analyst at the Deutsche Bundespost's Economic Research Institute in Bad Honnef, Germany, explained the impetus behind it.

"Different countries use different protocols and different standard transmission rates," he said. "Most U.S.-based companies don't have enough knowledge of all these nuances to optimize their networks, and it is very complicated and expensive to do all the research."

JOANIE M. WEXLER



# Westchester County opts for T3 links

BY JOANIE M. WEXLER  
CW STAFF

WHITE PLAINS, N.Y. — In its endeavor to interconnect several isolated local-area networks, Westchester County has decided to skip the T1 scene altogether and jump ahead to T3 (45M bit/sec.) technology.

While the county offices are currently using T1 gear from Timeplex, Inc. for low-speed RS-232 data connections and some voice connections, T1's 1.5M bit/sec. speeds are too sluggish to handle wide-area exchanges of the county's growing Ether-

net traffic, said Robert Gallagher, director of distributed systems.

Instead, Gallagher said, the county will initially invest \$200,000 in four Timeplex TX3/Superhub systems, which will communicate over the wide area via private microwave radio

links. A private microwave network was chosen, Gallagher said, because the price of leasing terrestrial T3 lines from New York Telephone Co. is currently sky high.

For Gallagher's application, leased T3 lines from the local carrier would cost the county \$25,000 per month, he explained.

The only delay on the project,

which is slated to be up and running by fall, is the county's selection of a microwave radio equipment vendor. Gallagher said he expects to invest another \$200,000 in radio equipment, "so the total payback of having a private network will be about eight months," he said.

Timeplex's T3 gear will collect traffic from the county's 15 existing Timeplex Link/2+ multiplexers and concentrate it over the higher speed links.

Currently, Link/2+ multiplexers are used to haul traffic from about 2,000 stand-alone personal computers and dumb terminals to two mainframes in the data center here via T1 interface-equipped bridges.

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## 3Com unveils bridge gear

BY JIM NASH  
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. recently announced additions to both its adapter card and bridge product lines. The networking company said it is shipping a Micro Channel Architecture 32-bit bus master Ethernet adapter and a new version of its router.

In an unrelated move, 3Com announced it will not sell off its Work Group Systems Division. The division, which is responsible for making network servers, workstations and related software, was one of the operations that in January 3Com said it would cast off.

Late last year, the firm decided to abandon its local-area network operations and move more directly into internetworking. 3Com sold its Maxess Systems Network Architecture Gateway Division shortly afterward.

A spokesman for the company said keeping the division will have no financial or structural ramifications for the organization. The spokesman also said buyers were willing to pay 3Com's undisclosed price but were unwilling to guarantee service or support standards that 3Com demanded.

Etherlink/MC 32 could give users noticeably better performance, said Rick Reed, network manager at Aion Corp. in Palo Alto, Calif. Because it is a bus mastering-based adapter, Etherlink/MC 32 takes some of the data transfer duties away from the central CPU, allowing the CPU to perform more quickly.

Reed added that the jump from 16 bit to 32 bit will boost performance. The adapter is selling for \$899 and includes Novell, Inc. Netware Version 3.0 drivers and drivers for network driver interface specification-compliant DOS and OS/2 software.



# Users, vendors make Mumps contagious

BY ELISABETH HORWITT  
CW STAFF

COLLEGE PARK, Md. — A band of users and vendors wants to create a Mumps epidemic via an "open" networking interface that is said to give applications on multivendor systems access to Mumps databases.

Mumps, the Massachusetts General Hospital Utility Multi-Programming System, was developed 20 years ago as a high-level programming language with embedded database functions. While Mumps began as a medical system, it has caught on in the government as well as in a variety of commercial sectors, particularly overseas, according to Mumps Users' Group spokeswoman Peggy Hoffman.

There are now approximately 75,000 Mumps users worldwide. Mumps' chief attractions are its ability to support high-volume database interactions and the terseness and flexibility of its language.

"I like Mumps' ability to allow one to concisely program," said Carl Bower, a computer specialist at the Department of Veterans Affairs (VA). "I also like its ability to support intensive interactive processing — you can do a lot of concurrent database accesses with Mumps."

The VA's health services and resources administration uses Mumps almost exclusively for health administration and clinical applications, Bower said.

## Virtual island

Open Mumps Interconnect, which was developed by the Mumps Users' Group, was designed to make the system's unique database features available to a broader group of systems and users. Right now, each vendor's Mumps implementation is virtually an island, accessible only by terminals and workstations designed to access that particular system.

In contrast, applications written to Open Mumps Interconnect would be able to access any Mumps server, according to John Althouse, chairman of the Mumps development subcommittee on networking and communications. What is more, client applications such as Lotus Development Corp.'s 1-2-3, once written to Open Mumps Interconnect, can access Mumps databases without requiring the client workstation they are running on to support full Mumps protocols, Althouse said.

The VA is so eager to get Open Mumps Interconnect that it has put a stipulation into some recent computer systems contracts that vendors must support the protocol as soon as it becomes available, Bower said. There is "a crying need" within

the VA for users to be able to access Mumps databases on a variety of remote systems, he added.

"I may be a dreamer, but I like the picture of one [distributed] system that makes clinical and administrative data available nationwide," he said.

Ten years ago, the only way to share data among different Mumps implementations was via magnetic tape, Bower said. More recently, various vendors have provided links between different Mumps systems, such as personal computers and Digital

Equipment Corp. VAXs, on a proprietary, one-to-one basis. "This first pass of OMI probably won't meet everyone's needs, but as a first step up from nothing, it's a big one," he said.

The user group designed Open Mumps Interconnect to be

easily portable to any underlying network protocol, so "there is no reason why you can't implement it on any virtual circuit," Althouse said. A demonstration scheduled for June will have a variety of multivendor Mumps implementations communicating via Open Mumps Interconnect on top of Transmission Control Protocol/Internet Protocol, running over Thinwire Ethernet.

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NEW PRODUCTS

**Local-area networking software**

Netmanage, Inc. has announced Chameleon, a Transmission Control Protocol/Internet Protocol applications package.

The Microsoft Corp. Windows 3.0-based software allows remote logons, transfers files and isolates problems on Token Ring and Ethernet networks. Chameleon communicates with host operating systems, including IBM's AIX, VM and MVS; Digital Equipment Corp.'s VMS and Ultrix; and The Santa Cruz Operation's Unix.

The product costs \$400.

**Netmanage**  
10020 N. DeAnza Blvd. 101  
Cupertino, Calif. 95014  
(408) 257-6404

**Network management**

Bicc Data Networks, Inc. has announced Version 3.0 of the Isovlew Network Manager, an open systems-based management system for OS/2 platforms.

Isovlew's capabilities include multi-level topology display, performance monitoring with graphical display and fault management. The new version uses a modular design, allowing users to customize the product to their system require-

ments. The Kernal provides management access control, a graphical user interface and general management functions. Support modules can be added to manage specific bridges.

The Kernal is priced at \$5,000; Support Modules range from \$500 to \$1,000.  
**Bicc Data Networks**  
1800 West Park Drive  
Westboro, Mass. 01581  
(508) 898-2422

**OS/2 networking**

Sybase, Inc. has announced Sybase PC Net-Library, a set of networking modules integrating personal computer-based applications with Sybase's SQL Server.

The Net-Library runs under DOS, Mi-

crosoft Corp.'s Windows and OS/2 and integrates both third-party and custom C language applications with all SQL Server-supported platforms. Each interface module costs \$145.

**Sybase**  
6475 Christie Ave.  
Emeryville, Calif. 94608  
(415) 596-3500

**Electronic mail**

Novell, Inc. has announced Netware Message Handling Service (MHS) Version 1.5. The product was designed for large, complex networks.

It follows a standard MHS platform agreement between Novell and Action Technologies, Inc. and is interoperable with the worldwide MHS installed base.

The product lists at \$495 but is available for \$100 during a promotional period that ends in August. Users of previous MHS systems from Novell or Action Technologies can upgrade for \$50.

**Novell**  
122 East 1700 South  
Provo, Utah 84606  
(801) 429-7000

**Modems**

Ven-Tel, Inc. has begun shipping the pocket-size Fax Modem 24/96S.

The product features full duplex asynchronous communication at 2,400, 1,200 and 300 bit/sec. It supports Group III standard fax transmission at 9.6K bit/sec. The Fax Modem (\$189) operates for six hours on a standard 9-volt battery and weighs 6 ounces.

**Ven-Tel**  
2121 Zanker Road  
San Jose, Calif. 95131  
(408) 436-7400

**Front ends, multiplexers**

Timeplex, Inc. has announced voice transmission and other enhancements to the Link + T1/E1 multiplexer line.

New features include 8K bit/sec. voice compression and asymmetrical data link capability for the Link/2+ system (\$5,000 per voice module), increased capacity to 48 T1 lines for the Link/100+ hubbing system (starting at \$40,000) and distributed workstation capability for the Time/View 2000 network management system (\$4,000 per workstation).

All enhancements are scheduled to be available in the second quarter of 1991.

**Timeplex**  
400 Chestnut Ridge Road  
Woodcliff Lake, N.J. 07675  
(201) 930-4631

**Micro-to-micro**

Silverware, Inc. has announced an asynchronous communications software library for applications developed under Nantucket Corp.'s Clipper.

Silverclip SPCS is interrupt-driven and offers features including a 115K bit/sec. rate, ANSI terminal emulation, character filtering and flow control.

List price is \$349; the current introductory rate is \$299. Registered users of the company's Silvercomm library can purchase Silverclip SPCS for \$99.

**Silverware**  
Suite 740  
3010 LBJ Freeway  
Dallas, Texas 75234  
(214) 247-0131

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## EXECUTIVE TRACK



**Robert J. Stokes** has been promoted to manager of technical support at the Port of Charleston, S.C., Information Services Division.

Stokes was most recently a senior systems programmer. As manager, he directs a staff of five technicians and systems programmers and reports to John Christensen, manager of the Information Services Division.

Stokes is responsible for all systems programming and operating systems software as well as for the communications network required to support Orion, the port's automated manifest filing system. Orion links more than 400 waterfront businesses to the port and to the U.S. Customs Service for rapid cargo clearance.

Stokes joined the South Carolina State Ports Authority in 1984 as a programmer/analyst.

.....  
**Edward J. Curvey** has been named director of the Internal Revenue Service Quality Assurance Division in Washington, D.C.

He is responsible for a support program to ensure the quality and effectiveness of the IRS information systems program.

An IRS employee since 1978, Curvey had been director of the Contracts and Acquisitions Division since 1987. Before that, he was assistant director of the Facilities Management Division for four years.

Curvey holds a bachelor's degree from East Stroudsburg State College and a master's degree from George Washington University in Washington, D.C.

.....  
**Dick B. Schrader**, former director of MIS at the IBM World Trade Corp., has been named director of technical projects at **Bedford Associates, Inc.**, a consulting firm in Norwalk, Conn.

Bedford Associates, a subsidiary of British Airways PLC, helps clients integrate and implement high-volume transaction processing and associated data communications systems.

## IS adjusts as portables fly the coop

*Unable to corral laptop PCs on the desktop, managers still keep them under control*

BY MICHAEL FITZGERALD  
CW STAFF

**I**t's 10 a.m. Do you know where your company's laptop computers are?

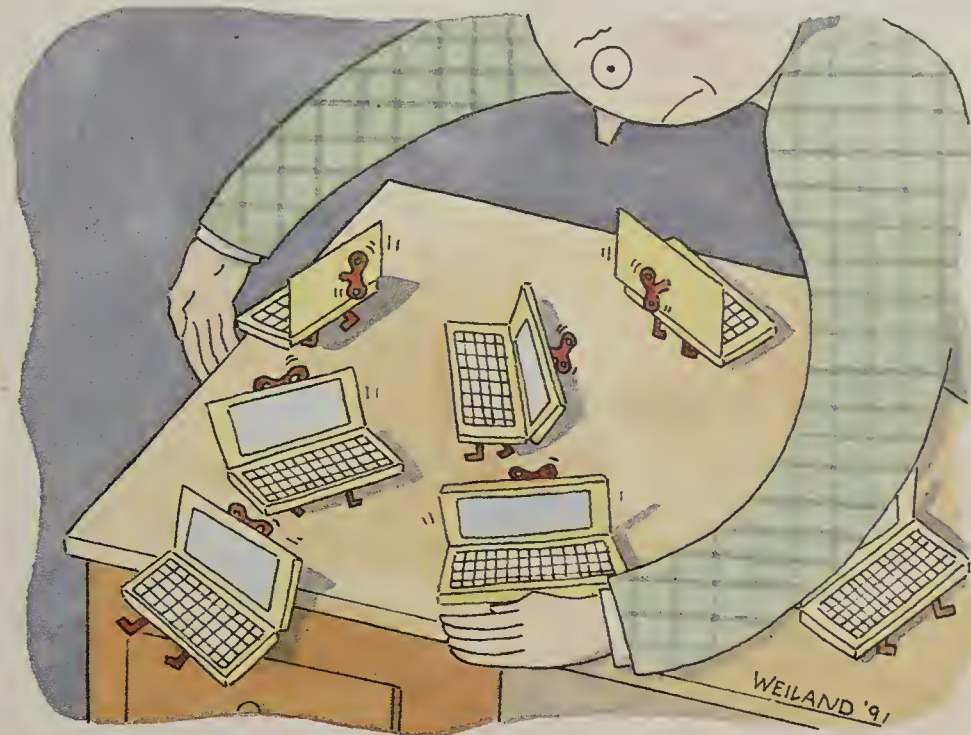
That question is an increasingly relevant one for information systems managers in the 1990s with the proliferation of laptop and notebook-size computers for a variety of business tasks. But fortunately, most corporate IS departments have their laptops under control — either by taking laptop management into their own hands or empowering end users to manage their own laptop technology. It is not a case of *deja vu* from the 1980s, when many IS groups turned their backs as personal computers invaded corporate America.

"I don't think we manage the laptops any different than we do the desktops," says Dick Nelson, vice president of agency systems at New York Life Insurance Co. "We've adopted a philosophy that anything that runs on the desktop must run on the laptops."

But another insurer, Blue Cross/Blue Shield of Massachusetts, handles things a bit differently. "I think you have to look at this as another platform; there are mainframes, desktops and then portables," says John Thibodeau, manager of end-user computing at Boston-based Blue Cross/Blue Shield.

Behind the general acceptance of portable computers is a more user-responsive IS management than was present in the 1980s. Many laptop implementations are driven by the users, and IS only offers support in many cases.

Nelson, for example, is a New York Life agency division executive, not an



Garison Weiland

IS staff member. Hyundai Motor America and Coors Brewing Co. are two other companies whose IS departments do not handle laptop management.

Separating the user group from IS "has a very positive effect," Nelson says. "The fact that I'm an agency officer instead of an IS officer puts me closer to my customers, so there's a layer of bureaucracy that gets eliminated by that." He is quick to point out that "there are liabilities, too — if you're out of the mainstream, you may miss certain things, but we try and coordinate with what's happening in the IS department."

The main issues facing companies that purchase laptops stem from the mobility of the machines: tracking, field service and data security.

Companies have adopted different

methods of handling these issues. At Blue Cross/Blue Shield, Thibodeau says, portables are routed in two ways. There is an office pool of laptops for workers who happen to need one for the night; the rest are permanently in the hands of the sales force.

At New York Life, there is a similar division — employees are given laptops by the IS department, and a separate group has been created to handle models for its 10,000 agents. This group recommends the kind of portables its agents should buy, but the agents are responsible for their own machines, including having to insure them in case of theft or loss.

Theft of laptops has been no small concern at Coors in Golden, Colo., which has given laptops to its

*Continued on page 58*

## Southwestern Bell goes with experience

BY CLINTON WILDER  
CW STAFF

**S**outhwestern Bell Corp. believes there is something to be said for longevity in this era of chief longevity officer turnover and company-hopping.

After the retirement of 40-year company veteran Kenneth R. Bender, 64, as vice president of information systems earlier this month, the St. Louis-based regional Bell holding company named 36-year veteran Ghyrane A. Davidson to replace him.

Davidson, 59, had been vice president of controller operations for Southwestern Bell's Texas region in Dallas for the past 12 years. He reports to Executive Vice President Rob-

ert Glaser, as did Bender.

Davidson is a strong advocate of user empowerment through personal computers, especially in a time of decreased IS spending.

### Trimming down

Southwestern Bell's IS operating budget dropped 4% this year to \$192 million, marking the second straight year of lower spending. Early retirement incentives have trimmed the IS staff by about 2% since the beginning of the year to its present size of 2,700 employees.

"Doing more with less has been the bottom line here," Davidson said.



**Bell veteran Davidson** has taken over CIO spot

Davidson joined Southwestern Bell in Little Rock, Ark., after graduating from the University of

Central Arkansas in Conway, Ark., in 1954.

His career began in the punch-card era and included overseeing the installation of Southwestern Bell's first IBM 1401 system in 1961.

He has been with the firm in financial and IS-related positions ever since, except for a two-year stint at AT&T in the late 1970s. While there, he helped develop AT&T's Customer Records and Information System.

At Southwestern Bell's controller operations in Dallas, Davidson spearheaded the development of a PC-based billing and customer service system. Southwestern Bell has an approximate 1-to-1 ratio of PCs and terminals to employees corporatewide.

Ranked No. 29 in the 1990 *Computerworld Premier 100*, Southwestern Bell was a participant in the recently completed MIT Management in the 1990s research program.





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## Portables

CONTINUED FROM PAGE 55

sales representatives, along with cars and portable telephones. Coors has had five of 200 laptops swiped, all but depleting its backup supply of six machines.

Although mainly a self-insured company, Coors has to purchase outside insurance for its laptops because of the high risk.

"I wish somebody else had to manage them," sighs Donna Whitley, project manager at Coors Brewing. "It's a major headache."

Adding to the red tape for Whitley, an end user, is the necessity of dealing with four different people in the Coors accounting department to track depreciation. When employees leave the company, they must return their laptops with all the original documentation and software — a provision sometimes requiring management enforcement.

Another headache can be getting service for laptop computers in the field, but managers contacted report good luck with their portables, so far. Most say that they keep a small store of laptops on hand, to be given to employees when they send in a machine for repairs or if their laptop is stolen.

### Data security an issue

The possibility of theft brings up the potential problem of stolen data. While most managers downplay this possibility, saying laptops get stolen for the hardware, not the software, several acknowledge that data security is an issue that hasn't been addressed.

"I suspect we are not as security-conscious as we should be, although most of the data on a single computer is not too sensitive," Whitley says.

Coors relies on changing user passwords when laptops get stolen and tells its sales force to do weekly backups. Relying on security at the mainframe level to keep peering eyes out is a staple at many companies.

Some managers report that they have to play policeman to prevent use of non-standard software or software piracy.

"That's a management headache," says Carrie M. Ulvestad, national manager of dealer communications at Hyundai Motor America in Fountain Valley, Calif. "You have to make sure they don't load games on the machine or other nonstandard software."

Barry Larson, director of systems and data processing at the Wisconsin Department of Transportation, agrees. "You have to be somewhat concerned about some of the software licensing issues," he says. "You have far less management control because they're not in the office."

Training new users, however, is rated less of a problem than one may expect. While this is in part because many portable users are already sophisticated PC users, many companies are giving laptops and notebook computers to noncomputer users. But managers report that training them as if they were new PC users is effective, and the transition to laptops is not as difficult as they expect.

In a Wisconsin highway construction project, "virtually none of those people were computer literate, and we felt that would be the major hurdle," Larson says. "Surprisingly, they really took to it."

Ultimately, the decision of whether laptops should be managed by IS or end

users depends on the organization. In many cases, it makes more sense for the users to be in charge, as long as things are kept under control.

If notebook computer and laptop use continues to expand, there could be a lot more happily surprised IS types, as long as they develop a strategy for their use in advance.

"A lot of companies are going through this," says Robert Peterson, director of sales and marketing IS at Coors. "IS organizations simply can't keep their arms around all the technology that's floating around in their organization. It's just a fact of life."

"The explosion of technology in our company in the last five years has been dramatic, and IS couldn't keep up with it."

## Signet plans to outsource IS

RICHMOND, Va. — Signet Banking Corp. will soon become the latest convert to the outsourcing movement. The company expects to sign a contract by May 1 that will put its data center, operations for telecommunications, systems and programming support in the hands of Electronic Data Systems Corp.

"We expect the contract will reduce information service operating expenses by \$137 million over 10 years," said Floyd Griggs Jr., the firm's executive vice president of information systems.

Griggs said that outsourcing will also enable the financial holding company to move faster on a number of strategic in-

formation technology initiatives that it plans to implement during the next four years.

The initiatives were the main motivation for the IS department to recommend an outsourcing evaluation to management in the first place, Griggs said. The initiatives include migration from a multivendor mainframe operation to an all-IBM environment and implementation of automation procedures to move Signet toward lights-out data center operations.

"EDS has resources the bank lacks to some extent" for implementing these plans, Griggs said.

ELISABETH HORWITT

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## C A L E N D A R

**Client Server '91**, a conference on the benefits of business process redesign along with client/server technology will be held May 28-31 at the Westin Hotel O'Hare in Chicago. Speakers at Client Server '91 include Novell, Inc. Chief Executive Officer Ray Noorda, Meta Group, Inc. President Dale Kutnick and Nolan, Norton & Co. President Richard Nolan.

For more information or to register, contact Bonnie Sen, Washington University, St. Louis, Mo. (314) 889-5380.

## MAY 12-18

**Nomad International Users Conference.** Las Vegas, May 12-16 — Contact: Chris Palomaa, Must Software International, Norwalk, Conn. (203) 845-5000.

**The Hammer Sales, Marketing and Service Conference.** Boston, May 13-15 — Contact: Hammer & Co., Cambridge, Mass. (617) 354-5555.

**Office Systems and Networks Dialogue.** Washington, D.C., May 13-15 — Contact: TTI, Santa Monica, Calif. (213) 394-8305.

**Telecom Developers '91.** Dallas, May 13-15 — Contact: Telecom Library, New York, N.Y. (212) 999-0345.

**Micra Focus Users Conference.** Orlando, Fla., May 13-16 — Contact: Micro Focus Users Conference, Palo Alto, Calif. (415) 856-9817.

**Entity Modeling: Techniques and Application.** Washington, D.C., May 13-17 — Contact: Barnett Data Systems, Rockville, Md. (301) 762-1288.

**Legent Corporation's Users Conference.** New Orleans, May 13-17 — Contact: Legent, Pittsburgh, Pa. (412) 323-2600.

**Video Expo.** Los Angeles, May 13-17 — Contact: Debbie Rotolo, Knowledge Industry Publications, White Plains, N.Y. (914) 328-9157.

**Data Administration Management Association Annual Symposium.** Gaithersburg, Md., May 14-15 — Contact: Andrea Tyndall Norris, DAMA, Washington, D.C. (202) 453-1790.

**Distribution/Computer Expo.** Chicago, May 14-15 — Contact: C. S. Report, Exton, Pa. (215) 827-7436.

**ID Expo.** Chicago, May 14-16 — Contact: Expocon Management Associates, Trumbull, Conn. (203) 374-1411.

**Multimedia Expo.** New York, May 14-16 — Contact: American Expositions, New York, N.Y. (212) 226-4141.

**Software Research Quality Week.** San Francisco, May 14-17 — Contact: Software Research, San Francisco, Calif. (415) 957-1441.

**Notional Energy Software Center.** Argonne, Ill., May 15-16 — Contact: NESC, Argonne, Ill. (708) 972-7250.

**Business Continuity Planning Conference.** Atlantic City, May 15-17 — Contact: Sungard Planning Solutions, Wayne, Pa. (215) 341-8790.

**Canadian Open Systems Conference.** Vancouver, B.C., May 15-17 — Contact: Corporation for Open Systems, McLean, Va. (703) 883-2700.

**Data Communications Conference.** Tyngsboro, Mass., May 15-17 — Contact: Andrea Fontaine, Wang Institute of Boston University, Tyngsboro, Mass. (508) 649-9731.

**Exchange '91.** Indianapolis, May 15-17 — Contact: Sterling Software, Dublin, Ohio. (614) 793-7000.

**Macworld Expo/Europe.** Amsterdam, May 15-17 — Contact: Macworld Expo/Europe, Amsterdam, The Netherlands. (011-31) 20-549-7040.

**Networks for the '90s.** Boston, May 15-17 — Contact: Wang Institute of Boston University, Tyngsboro, Mass. (508) 649-9731.

**North American Open Systems Conference.** Vancouver, B.C., May 15-17 — Contact: Corporation for Open Systems International, McLean, Va. (800) 759-2674.

**International Partnerships in Computers and Communications: Imperative for the 90s.** San Francisco, May 15-18 — Contact: International Computers and Communications, Washington, D.C. (703) 467-2604.

**Vantage Expo '91.** Waltham, Mass., May 16 — Contact: Betsy Minich, Imaging Technology, Woburn, Mass. (716) 938-8444.

**Videoconferencing: Tips and Techniques.** Dallas, May 16 — Contact: Informart, Dallas, Texas (214) 746-3500.

## MAY 19-25

**Adjusting to Reality: New Profit Strategies of 1991 and Beyond.** Palm Springs, Calif., May 19-22 — Contact: Information Industry Association, Washington, D.C. (202) 639-8262.

**International Industrial Engineering Conference.** Detroit, May 19-22 — Contact: IIE Registrar, Norcross, Ga. (404) 449-0460.

**Share 76.5.** Nashville, May 19-22 — Contact: Share, Chicago, Ill. (312) 822-0932.

**Cause Summer Institute.** Boulder, Colo., May 19-23 — Contact: Cause, Boulder, Colo. (303) 449-4430.

**Ingres World 1991.** San Jose, Calif., May 19-23 — Contact: Ingres, Alameda, Calif. (415) 769-1400.

**International DB2 Users Group Conference.** San Francisco, May 19-23 — Contact: IDUG headquarters, Chicago, Ill. (312) 644-6610.

**Association of Data Communications Users Conference.** Atlantic City, May 20-22 — Contact: Augie Blegen, ADCU, New York, N.Y. (612) 881-6803.

**Comdex '91.** Atlanta, May 20-23 — Contact: The Interface Group, Needham, Mass. (617) 449-6600.

**Midwest Electronics Expo.** Minneapolis, May 20-23 — Contact: Miller Freeman Expositions, Boston, Mass. (617) 232-3976.

**Windows World '91.** Atlanta, May 20-23 — Contact: The Interface Group, Needham, Mass. (617) 449-6600.

**Leadership in a Global Marketplace.** Atlanta, May 21-22 — Contact: Sharon Scott, Inforum Institute, Atlanta, Ga. (404) 220-2692.

**Systems 3X/400 Expo.** Rosemont, Ill., May 21-22 — Contact: National Productions, Salem, Mass. (508) 745-6010.

**Unix and Open Systems.** Santa Barbara, Calif., May 21-23 — Contact: Deborah Hay, Seybold, Boston, Mass. (617) 742-5200.

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An insurance company recognized that to remain competitive it needed to maximize MIS dollars by pulling together data from ten distinct databases. In just six months, the company captured and merged data from the ten systems, creating a single accurate enterprise model, translated into a new unified DB2 database.

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A leading registered stock broker/dealer decided to implement IBM's SAA strategy. The company used BACHMAN products to migrate databases that housed client statements and mailing lists into an enterprise model, by capturing and merging the data. New functionality was added and the model was forward engineered into a new DB2 design.

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# PRODUCT SPOTLIGHT

## Look beyond the 'I-CASE' label

*A closer look at 'integrated' tools reveals that assembly is often required, with no guarantee that the pieces will fit as you'd like*

BY DAVID SHARON

**N**ow that they've torn off the wrappings and had a chance to play with their new computer-aided software engineering (CASE) tools, many buyers have lost enthusiasm for their new software-erector sets.

Purchasers of analysis and design CASE tools spurred that market's growth rate to 67% from 1988 to 1989, but tales of frustration helped to quell growth, which fell to 20% just one year later.

There are many reasons why users have become skeptical: a lack of portability among hardware and software platforms, non-standard graphical user interfaces (GUI) and closed, unmodifiable architectures.

Chief among their frustrations is a lack of integration between the vendor's own front-end and back-end tools and among tools from various vendors. Adding salt to the wound is the proliferation of the term "I-CASE," which refers to a variety of techniques vendors use to market tools as "integrated."

Simply put, integration is the ability to bring together tools from all parts of the life cycle to operate as one. Information systems groups discovered that nonintegrated, "point" products lead to inefficiency and a lack of automated control.

The output of an analysis and design tool, for instance, loses some of its semantic meaning when it is loosely connected to another vendor's code generator.

In addition, many users would like to integrate their current development and maintenance tools with CASE software methodologies, structured methods

and object-oriented tools.

Vendors use the term I-CASE to mean three things: tool suites sold by a single vendor, integrated project support environments (IPSE) that are integration frameworks and tool-to-tool interfaces between products from multiple vendors.

We might do well to imagine that the "I" in I-CASE stands for "ideal" and not "integration." In that case, very few vendors would qualify. This ideal CASE environment could be compared to a software factory (see diagram page 62), where the factory itself is the environment

and the CASE tools are the machines. The machines are interconnected by conveyor belts, which provide the integration. All raw material, work in process and finished goods are stored in the warehouse or the CASE repository.

In this ideal environment, five operating requirements are met: Tools can be integrated and interconnected, there is an open architecture and common user interface, and the system is portable to any hardware or software environment (see story page 66).

### Striving for ideal CASE

The products that come closest to the ideal I-CASE environment are the systems sold by single vendors (see chart listing page 76). Andersen Consulting, Texas Instruments, Inc., Knowledgeware, Inc. and CGI Systems, Inc. all offer product suites in which the tools are tightly coupled and are governed by a rigorous methodology and produce complete systems.

These environments provide a central repository for storing project data as well as the tool-coordination mechanisms and methods for controlling and monitoring all project tasks.

Even among these tools, however, satisfaction with the level of integration varies (see Buyers' Scorecard page 72).

A much more substantial problem is that these systems essentially lock the user into using a single architecture. If a user wanted to use most of the tools provided by the single vendor with another vendor's reverse engineering tool, he'd have to resort to using the import/export facilities — a somewhat primitive method — provided by the single vendor.

### Unlocked architecture

Realizing that most organizations are unwilling to lock into a single architecture — whether they want to buy their development tools from more than one

*Continued on page 62*



Steve Lyons

## INSIDE

### What's New?

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Sharon is president of CASE Associates, Inc. in Oregon City, Ore., a consulting firm specializing in CASE market and product research. He also publishes CASE product directories and buyers' guides.



## Full deck

Most vendors offer only a subset of a full life cycle environment. A complete life cycle software development environment includes the following:

### DEVELOPMENT

#### • Front-end CASE:

Planning, requirements, analysis, design, simulation and prototyping.

#### • Back-end CASE:

Code generation, editing, compiling, testing, debugging and integration.

### TEAM ENGINEERING

#### • Project database:

Communications, monitoring, security and control.

#### • Management:

Methodology, configuration, project and acquisition.

#### • Support:

Maintenance, re-engineering, verification, database administration and control and documentation.

*Continued from page 61*

source, or they have internally developed tools they wish to integrate into a CASE environment — some vendors are beginning to offer frameworks or IPSEs. Two examples of IPSEs are Hewlett-Packard Co.'s Softbench and Atherton Technology, Inc.'s Software Backplane.

IPSEs do not perform actual software development functions but provide an environment that can integrate tools from other vendors. Within this environment is a common user interface, a central project repository and tools for configuration, process, project and requirements management to support team engineering. IPSEs offer operating systems portability and tool coordination facilities.

These frameworks are fashioned around the reference model from the upcoming Portable Common Tool Environment standard (PCTE). PCTE, which is one of three primary guidelines for building integrated environments, includes the essential ingredients for integration as well as the framework for an IPSE.

IPSEs use repository-based integration to link tools together and transfer information among them under a common user interface. (The single-vendor products mentioned above also use repository-based integration.) Like an automated

warehouse, the repository stores the output of every life cycle phase and the relationships between the outputs.

IBM's AD/Cycle and Digital Equipment Corp.'s Cohesion are also IPSEs, but they have front-end and back-end tools already integrated. As with Softbench and Software Backplane, multivendor tools can be integrated into AD/Cycle and Cohesion.

Some IPSEs do pose problems for users, however. Current implementations offered by hardware manufacturers — with the exception of HP's, which runs on Sun Microsystems, Inc. systems — are portable only to proprietary platforms. They can also exhibit poor semantic information transfer among tools, and there can be extensive effort involved to add a new tool to the environment.

### Blue-collar answer

The most primitive method for integrating CASE tools is to use tool-to-tool interfaces from vendor alliances. These interfaces are usually provided through import/export facilities or file-transfer mechanisms. Some vendors refer to this as multivendor I-CASE.

Tool-to-tool interfaces may be the most primitive, but they are also the oldest, simplest and most commonly used mechanism for CASE tool interconnection, especially between analysis/design tools and code generators or among analysis/design tools from different vendors.

The primary function of these interfaces is to read and write information from one tool's data dictionary to another's, eliminating the need to re-enter data and thereby reducing data entry errors. Either the interfaces are provided by the vendor, or the customer must write his own using a vendor-supplied I/O utility.

Many strategic alliances have evolved from this approach, including those among Deloitte & Touche, Index Technology Corp. and Pansophic Systems, Inc.; Interactive Development Environ-

## Checklist

Before you buy an "integrated" tool, ask the vendor if it meets the following criteria:

- ✓ Do the tools operate together as if they were one multifunction tool?
- ✓ Can I do all the work I need to do?
- ✓ Can I use my own tools or my favorite tools from another vendor without losing functionality?
- ✓ Is data shared between tools, eliminating the need to re-enter data and allowing the outputs of each tool to be verified for consistency and completeness?
- ✓ Is all the data kept in a common database or repository?
- ✓ Is use of the tools governed by a definable process or methodology?
- ✓ Do the tools use a common user interface?
- ✓ Are the results meaningful, usable and complete? That is, are all requirements from the analysis phase used in the design phase, and is 100% of the code generated from the design specifications?

DAVID SHARON

## Short term can be worth it

BY SUSAN R. NYKAMP  
CW STAFF

Integration isn't always a top priority in CASE tool purchases. Sometimes it makes sense to start small with an easy-to-use tool that addresses only one part of the development life cycle.

Just ask Howard Kushner at MCI Telecommunications Corp. and Dale Hardy at The Hanover Insurance Co. Each made a \$7,000 investment in front-end CASE tools they may very well abandon after their firms settle on integrated, full life cycle tools.

Kushner, project manager at MCI, is using EasyCase Plus from Evergreen CASE Tools, Inc. in Redmond, Wash.

"If we only get a year of use out of EasyCase, it will easily pay for itself," Kushner says. "It doesn't offer everything the big guys do, but it's pretty much everything we need right now."

An MCI corporate committee is in the midst of evaluating full life cycle tools as a standard platform. In the meantime, Kushner wanted multiple

users to do process modeling but didn't want to make a big training investment. Priced at about \$300 for each copy, EasyCase fit the bill.

"It's not the top-of-the-line CASE tool... but that's all right," he says, adding that his group will wait to do things such as enterprise modeling when the corporate standard for a full life cycle CASE tool is established.

Hardy, a systems consultant at Hanover Insurance, had similar requirements. He is using Visible Analyst Workbench from Visible Systems Corp. Hanover is also evaluating full-function tools, but Hardy needed a tool that would allow multiple users on a local-area network to do data modeling.

Hardy rejected Erwin from Logic Works, Inc. and Pose from Computer Systems Advisors, Inc. as cumbersome to use and says EasyCase "isn't in the same league" as Visible Analyst.

Hardy says he is impressed with Visible Analyst's user interface and process modeling capabilities but finds the reporting capabilities limited.

ments, Inc., Saber Software and Frame Technology Corp.; Index Technology and Sage Software; and Cadre Technologies, Inc., Pansophic and Interleaf, Inc.

Tool-to-tool interfaces are viable because they enable users to pick and choose the tools they need. However, the deficiencies involved make this method better described as "interconnection," not integration. The utilities provided by the vendors for tool interconnection are typically ASCII file extracts or imported templates that deal with the data names and attributes but not the underlying

*Continued on page 63*

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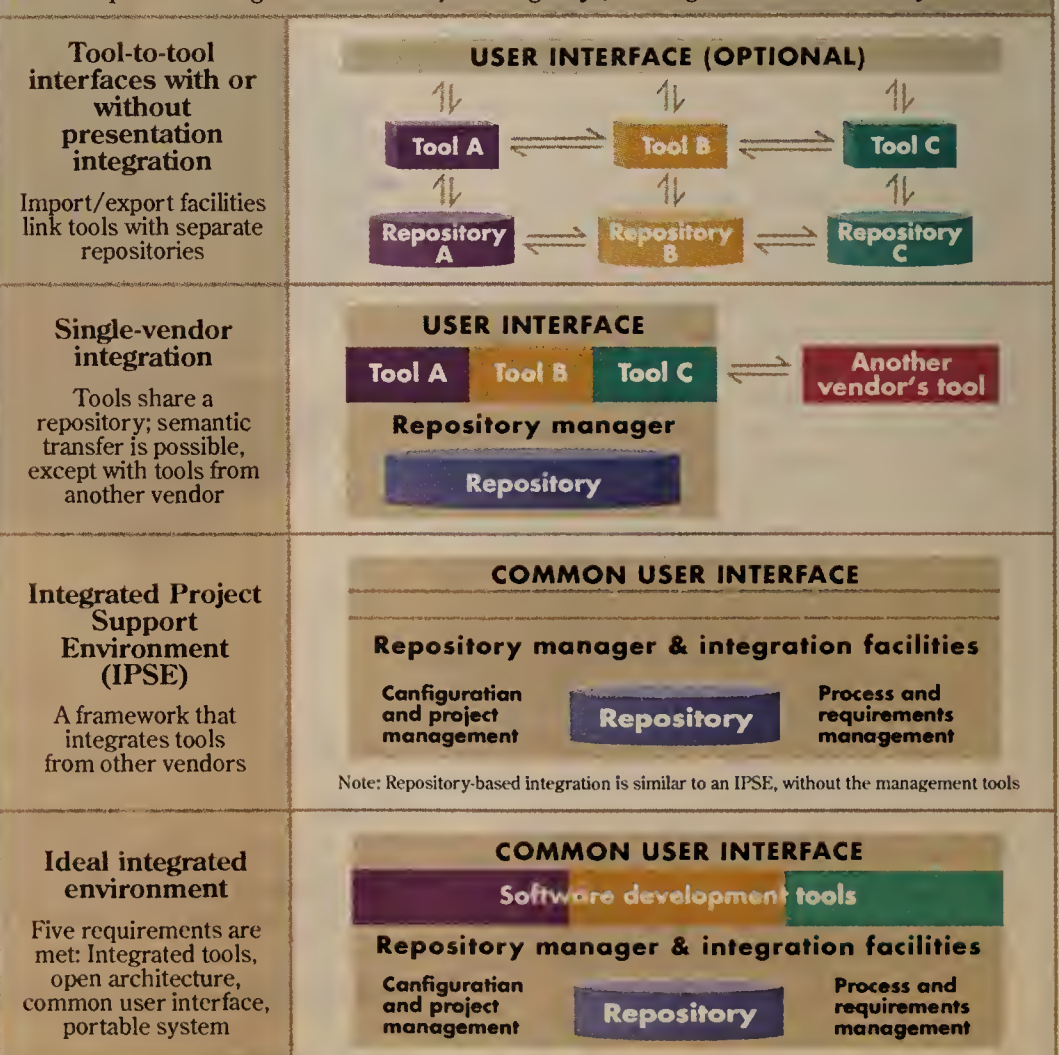
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### Integration techniques

*Current products integrate tools in the following ways, although the ideal does not yet exist*



Source: Case Associates, with reference to Case Outlook, 1989, No. 2

CW Chart: Doreen St. John



Continued from page 62

semantics of the information transfer.

There is no common environment because each tool has its own repository that users must maintain separately. The burden of integration is on the tool user, who must reconcile the multiple user interfaces, tool repositories and each tool's processing requirements and outputs.

Some vendors transfer information directly from one tool to the other, bypassing the data dictionary. This is the optimal tool-to-tool interconnection technique.

One example of this is Pansophic's Exchange, which is used to modify the designs created by Index's Excelsior, which in turn drives the Telon code generator. Sage and Interactive Development also use this approach.

#### Presentation integration

Tools can appear to be more integrated than they actually are when coordinated by a common user interface, called "presentation integration." With a GUI such as the Open Software Foundation's Motif or X Window System, two disparate tools can have a common look and feel.

This approach ignores semantic transfer and repository issues. What is lacking is data storage and retrieval, tool coordination and process management.

The primary barriers to the ideal CASE environment are not technical but

rather psychological and financial. Vendors that think they can "do it all" are reticent to integrate with others, while best-in-class vendors tend to leave the problem of integration to someone else.

Vendors with tools supporting limited life cycle phases must choose among strategic partners or become yet another participant in someone else's framework. Single I-CASE vendors must either decide who to integrate into their proprietary environment or rearchitect their products to create an environment open to all vendor tools.

The ideal software factory should emerge by 1995. In the meantime, smart shoppers will ask all the right questions to find a vendor whose integration vision matches their requirements. •

## Software factory components

The ideal integrated CASE environment is no different than a manufacturing operation for software — a software factory of sorts. The operating requirements are similar to those for building and running the ideal manufacturing operation:

- The ability to integrate tools using a common user interface (control panel) for invoking the tools and a repository for storing the data created by the tools. Project data should be stored and managed in one central information warehouse.
- A mechanism for interconnecting tools to transfer the semantics of data created by one tool and used by another (the assembly line). The tools must use the same

interpretation of the data transferred.

- A methodology, or mechanism, for defining the software engineering process rules and requirements that govern the use of the tools making up the environment (process control). Without a methodology, the factory is out of control.
- An extensible, open architecture that allows users to change each tool's behavior and rules to conform to their cultures and requirements (machine retooling).
- An environment that is portable over a wide range of operating systems and platforms to preserve the investment and extend the life of the environment.

DAVID SHARON

## Vendors' claims; users' realities

Typical claims by vendors include the following:

**PROMISE:** Full life cycle support.

**REALITY:** No vendor offers a full life cycle product as most users understand the term. Most offer only a subset of the life cycle, so be sure to ask which specific phases are supported.

**PROMISE:** Complete support for one life cycle phase or another.

**REALITY:** Some products provide only limited support; for example, 100% code generation is not always possible.

**PROMISE:** Integrated tools.

**REALITY:** Users expect all tools in the environment to work together in a consistent, uniform manner. The truth, however, is that not all tools are integrated the same way.

**PROMISE:** Open architecture.

**REALITY:** Users expect to incorporate their own and other vendors' tools into the environment. However, the vendor may provide only an import/export facility for data sharing, not full integration.

**PROMISE:** Integrated environment.

**REALITY:** Users expect a common user interface and the ability to incorporate multivendor tools with a common look and feel. A common user interface does not guarantee that the tools are well-integrated or that they provide complete support.

DAVID SHARON

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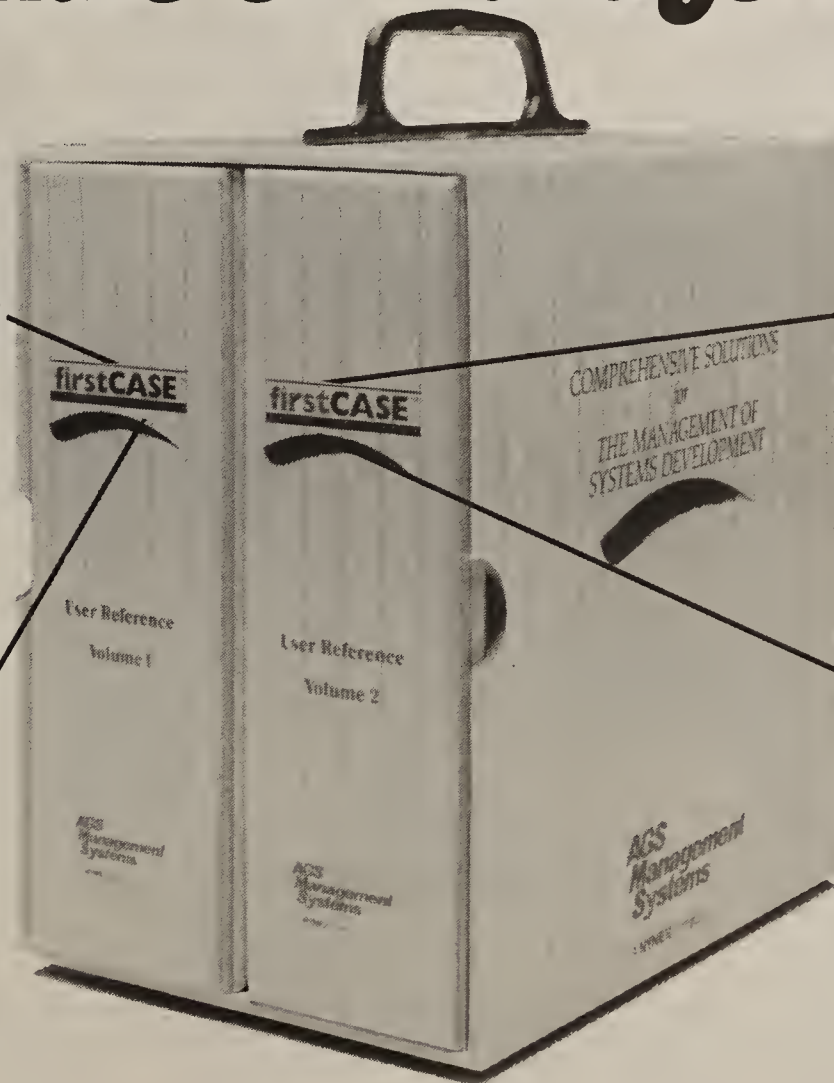
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# 'Have I got a repository for you!'

BY STEVEN BARSH  
and WILLIAM GILTINAN

You read all the articles on AD/Cycle and Cohesion. You hear about dictionaries, encyclopedias and repository-enabled tools. You're trying to get the repository that makes the most

sense for you, but all you're getting is confused.

So, how do you choose a repository? Basically, a repository has three components:

- A database for storing information about software projects.
- An interface through which computer-aided software engi-

neering (CASE) tools can access the database.

- A definition of what information the tools can store in the repository.

The goal of a repository is to provide one central location for many tools to store and exchange information about soft-

ware development projects.

Virtually every CASE tool vendor has its own proprietary repository. Other vendors are creating universal repositories for all CASE tools, including IBM with Repository Manager, Digital Equipment Corp. with CDD/Repository, Computer Associates International, Inc. with CA '90s Repository and Oracle Corp. with CASE\*Dictionary.

When choosing among these products, first consider the database — its performance, how well it runs in a distributed environment and how well it interacts with your current hardware and software.

Next, consider the tool interface. If the repository vendor provides an unwieldy interface, few tool vendors will be willing to integrate their products.

For its new CDD/Repository, DEC chose to take an object-oriented approach to create a simple, flexible tool interface.

IBM, on the other hand, formed alliances with some of the major CASE vendors and says these tools will interface with its repository.

Third, consider the richness of the data definition (metamodel) that defines what informa-

## Repository vendors

- Amdahl Corp. (Sunnyvale, Calif.)
- Computer Associates International, Inc. (Garden City, N.Y.)
- Computer Corp. of America (Cambridge, Mass.)
- Digital Equipment Corp. (Maynard, Mass.)
- DSIMS Corp. (Waxahachie, Texas)
- IBM (Armonk, N.Y.)
- Infospan Corp. (Edina, Minn.)
- Oracle Corp. (Redwood Shores, Calif.)
- Unisys Corp. (Detroit)

Source: SECA, Inc. CW Chart: Doreen St. John

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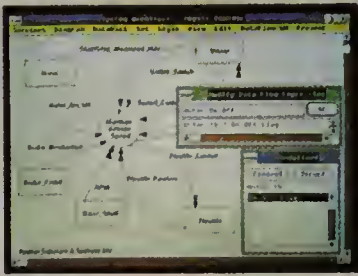
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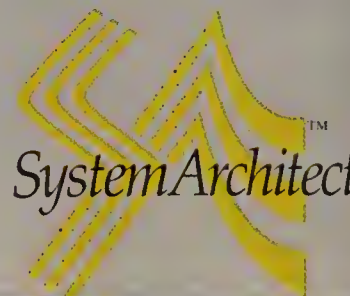
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tion tools can be stored in the repository. If the metamodel does not encompass all of the information used by a particular CASE tool, the CASE tool vendor either cannot store that information in the repository or must unilaterally extend the repository to include that information.

For instance, if you use a tool with a new diagramming technique, another vendor's development tool may be unable to read the information captured in those diagrams. Why? Because the diagramming tool had to extend the metamodel so it could store information captured in the new type of diagram. Tool B knows nothing about Tool A's modeling technique because it is not defined in the base metamodel.

IBM's strategy is to create a metamodel so comprehensive it will not need to be extended. Its metamodel is so far incomplete. DEC and Oracle both have complete metamodels, but they're expecting CASE tool vendors to extend the base metamodels and provide tools to help the vendors perform the extension. •

Barsh is president and Giltinan is a senior consultant at SECA, Inc., a Conshohocken, Pa.-based firm that provides software engineering and CASE tool implementation and consulting services.



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# New trends abound in CASE

BY GENE FORTE

In the face of fierce competition and industry consolidation, computer-aided software engineering (CASE) vendors are scurrying to add more functionality to their product lines. There are many trends for users to keep an eye on, including the following:

► **Cross-development tools.** Local-area network-based cross-development tools allow developers to define, generate and test applications on a workstation or personal computer, waiting until deployment to specify the target platform.

Because applications need to be speci-

fied just once for multiple platforms, management can not only defer equipment decisions but also move applications or upgrade to new platforms with fewer restrictions. Cross-development also provides a CASE environment naturally suited to client/server applications.

CGI Systems, Inc.'s Paclan for OS/2 LANs and Paclan/X for Unix LANs exemplify this trend. An application designed on one workstation or a group connected by a LAN to a Paclan repository server can be targeted at IBM OS/2, MVS and OS/400 platforms or Unix, Tandem Computers, Inc. and Digital Equipment Corp. VMS platforms. Andersen Consulting's

Foundation for Cooperative Processing and the upcoming version of Texas Instruments, Inc.'s IEF are two other cross-development products. However, both still require an encyclopedia, or repository, based on a target platform.

Intersolv, Inc. — the newly merged Sage Software and Index Technology Corp. — has moved its APS workbench to the PC network, as has Software AG of North America, Inc. with its recently announced Entire architecture.

► **Hypertext guidance for CASE development methods.** Faithfully following a rigorous development method can be difficult for new CASE users. Some vendors now offer methodology guidance tools that use hypertext to support meth-

od-browsing at various levels of detail.

These tools use built-in application examples to help developers through rough spots. For example, The Delphi Group's Software Engineering Environment provides a guidance facility for a variety of preconfigured common methods, although it also accommodates proprietary processes.

James Martin Associates' IE Expert gives a comprehensive explanation of the information engineering method with stages, tasks, deliverables and typical examples. The developer can explore information engineering in any sequence to the depth desired and can hot-key to tools such as TI's IEF and Knowledgeware, Inc.'s Information Engineering Workbench.

► **Practical approaches to reuse.** CASE vendors are starting to provide facilities that allow developers to reuse code. For large-scale reuse, Andersen Consulting's Designware products come with turnkey applications implemented using the company's Foundation environment. Developers can create a customized version of a generic application by modifying data definitions and screens and regenerating the application without touching source code.

TI is pursuing a similar strategy with its IEF templates. These include a complete general ledger package and an upcoming investment management system for insurance and mutual funds companies derived from Control Data Corp.'s IMIS.

Computrol, Inc. is taking a different approach to making its Master Financial System reusable. Instead of a top-down code-generation environment, Computrol has made the product modular and has added parameters for each functional subsystem. Developers can select and customize the desired functionality simply by altering tables and screens.

Traditional reuse focuses on small modules of functionality — called objects — with well-defined interfaces that can be assembled into larger applications. Because graphical user interfaces (GUI) are an ideal application for the object paradigm, GUI tools such as Apple Computer, Inc.'s Macapp and the X Window System library are among the leading facilitators of small-scale reuse.

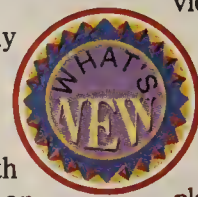
However, newer products extend the simple GUI building blocks to more powerful objects that are essentially mini-applications. Examples of those tools include Asymetrix Corp.'s Toolbook for Windows 3.0, Expertelligence, Inc.'s Spokeaction and Integrated Systems Division's Systembuild.

► **CASE for the chief executive officer.** The newest niche of CASE tools allows business processes to be directly modeled and automatically converted to functioning computer systems.

Vendors catering to this niche claim that CEOs as well as applications developers will find the tools useful. One example is Metavision from Applied Axiomatics, Inc. Key to the company's approach is its Cybernetic Business Model, which generates systems directly from a visual model of business operations.

Daisys from S/Cubed, Inc. allows businesspeople and developers to use familiar objects to describe the requirements of a computer system. •

Forte is president of Portland, Ore.-based CASE Consulting Group and executive editor of "CASE Outlook," an international journal on software design automation.



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## INTERSOLV PRESS RELEASE

### SAGE AND INDEX FINALIZE MERGER, FORMING INTERSOLV

Rockville, Md., March 19, 1991 -- Sage Software, Inc. and Index Technology Corporation today announced completion of their previously announced merger, forming a new entity to be called INTERSOLV, Inc.

Kevin J. Burns, former chief executive officer of Sage, will serve as chairman and CEO of INTERSOLV.

Burns said the merger creates the industry's largest supplier of computer aided software engineering (CASE) tools, with more than 100,000 customers at over 10,000 sites worldwide.

"The formation of INTERSOLV enables users to turn to one vendor for CASE products that span mainframe, workstation and PC platforms. These products deliver to users the very best of integrated CASE in an open architecture, as their needs dictate," said Burns. "INTERSOLV's mission as a company is to serve our customers by providing a family of software development tools that ensure on-time, on-target delivery of high-impact information systems solutions."

INTERSOLV's product line addresses the following key areas of the software development lifecycle: design via its Excelerator products, application generation with the APS family of products, configuration management through the PVCS/Make product line and maintenance/re-engineering through Design Recovery. INTERSOLV is the only CASE vendor to offer a LAN-based desktop development environment.

INTERSOLV also announced today that it will continue and expand its relationship with IBM Corporation as an IBM AD/Cycle Business Partner, in keeping with the corporate emphasis on commitment to standards.

INTERSOLV is headquartered at 3200 Tower Oaks Boulevard, Rockville, Maryland, 20852; phone (301) 230-3200.

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Our solution takes into account the true realities of the 1990's development environment—development cycles, methodologies, how developers really work, and existing cultures.

Other CASE companies may have the right vision, but they use the wrong approach. Simply put, our approach is right because it gives you all the functionality you need, and it doesn't force you to change your culture and projects to fit a rigid model tool set.

It's a fact: Our products are designed to work together, alone, or in concert with other complementary products. What's more, our solutions span the

entire development lifecycle. They include Excelsior for design, APS for application generation, PVCS for configuration management, and Design Recovery for maintenance/re-engineering.

Just as important, we're the only CASE vendor to offer solutions that support a true multi-user development environment using workstations and LAN server technology.

Add to that our commitment to an open architecture and adherence to industry standards such as IBM's AD/Cycle, and you finally have the flexibility needed to help you realize the full potential of CASE.



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## TI's IEF scores high for integration, benefits delivery

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### Integrated computer-aided software engineering (I-CASE) tools

Total scores reflect average user ratings for all measures, weighted by user-assigned importance.  
Response base: IEF: 33; Pacbase: 40;  
Foundation: 30; IEW/ADW: 40

Product	Highest ratings	Lowest ratings
<b>Texas Instruments' IEF</b> 	Integration of life cycle stages Ability to increase quality Code generation capabilities	Ability to work with other vendor's tools Support for local-area networks Training time required
<b>CGI Systems' Pacbase</b> 	Data repository capabilities Code generation capabilities Ability to increase quality	Ability to work with other vendor's tools Training time required Planning, analysis and design features
<b>Arthur Andersen's Foundation</b> 	Integration of life cycle stages Ability to increase quality Support for local-area networks	Ability to work with other vendor's tools Code generation capabilities Training time required
<b>Knowledgeware's IEW/ADW</b> 	Ability to increase quality Planning, analysis and design features Integration of life cycle stages	Support for local-area networks Effectiveness of testing Ability to work with other vendor's tools

BY MICHAEL L. SULLIVAN-TRAINOR  
CW STAFF

Like street corner jugglers, vendors of integrated computer-aided software engineering (I-CASE) tools are being asked to balance an increasingly complex set of items to satisfy the wishes of their audience. Not only do they need to excel in planning, analysis and design features, but they must also offer strong repository and code-generation functions.

Small wonder that the market for single-vendor I-CASE tools can be narrowed down to four players with significant market share: Texas Instruments, Inc.'s IEF, CGI Systems, Inc.'s Pacbase, Arthur Andersen & Co.'s Foundation and Knowledgeware, Inc.'s IEW/ADW.

When *Computerworld* polled users of these four products, IEF received the highest ratings overall from its users for I-CASE features, followed closely by Pacbase. Foundation and IEW/ADW finished in close competition further back.

Each group of users rated only its own product. A 1-to-10 (poor to optimal) rating system was used for each feature and function. (See methodology next page for explanation of how total scores are derived.)

Overall, users ranked integration and repository features as more important than individual front-end or back-end categories.

IEF placed first in 12 of 19 Buyers' Scorecard categories, in addition to garnering the highest individual rating — 9 out of 10 — for product set integration.

IEF topped three out of four benefit-oriented categories, including increasing applications quality (8.9), programmer productivity (8) and value for the

dollar (7.6). Pacbase users rated their product highest in the remaining benefit category: ability to increase speed of applications development.

IEF scores were particularly low in two areas: ability to work with other vendors' tools (3.9), a category in which none of the products received higher than a 4.8, and support for local-area networking (4.4). Pacbase achieved the highest ratings for data repository capabilities (8.7), which ranked as the second most important consideration for users overall. Second to IEF in most categories, Pacbase garnered top marks in quality of technical support (7.6) and compatibility with the current environment (7.2).

Four last-place finishes reduced Pacbase's overall score. These lower rankings were: working with other vendors' CASE tools (3.8), training time required (4.9), ease of use (5.8) and planning, analysis and design features (6).

Foundation received the top mark for LAN support (7.1). Its highest user ratings came in the categories of integration (7.4) and increasing applications quality (7.3). Overall, Foundation placed last in 10 of 19 categories.

IEW/ADW, the front-end tools market leader, achieved a 7.5 rating for planning analysis and design features, a second-place finish behind IEF's 7.9. Another 7.5 rating placed the product second for integration behind IEF.

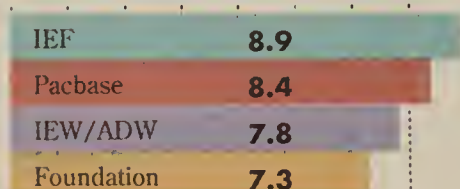
IEW/ADW also placed first in its ability to work with CASE tools from other vendors, with a 4.8 rating from its users. However, four last-place ratings, including ability to increase development speed (6.2), programmer productivity (6.1), efficient programming capabilities (5.5) and support for LANs (3.1) — the lowest individual rating — caused IEW/ADW to rank behind Foundation in the overall score. •

### KEY RATINGS

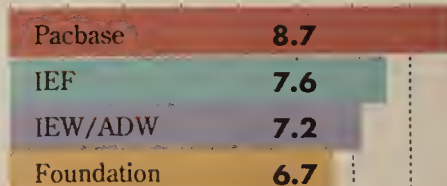
Quality, productivity, integration and value are among the most important categories for I-CASE buyers, and TI's IEF users give their product the highest rating in those areas. Speed and data repository capabilities are also vital, and CGI Systems' Pacbase achieves the top scores on those counts.

User importance rating:

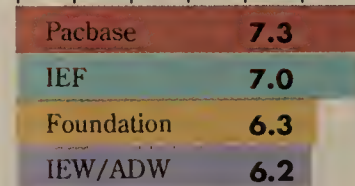
#### 8.9 Ability to increase application quality



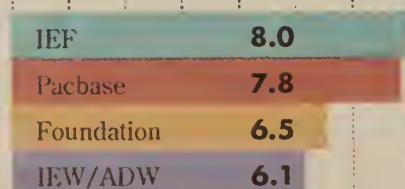
#### 8.4 Data repository capabilities



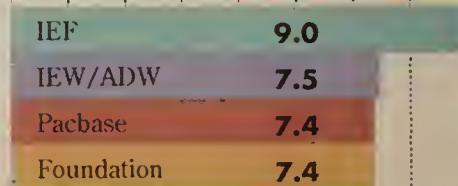
#### 8.4 Ability to increase the speed of applications development



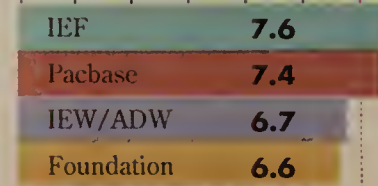
#### 8.3 Ability to increase programmer productivity



#### 8.2 Integration of life cycle stages within product set



#### 8.1 Value of the dollar



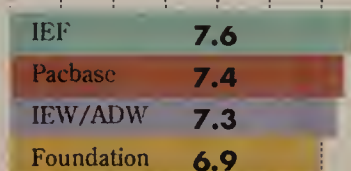


## A CLOSER LOOK

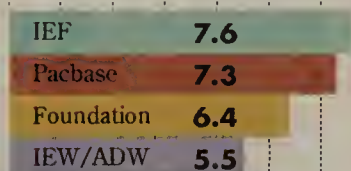
IEF also receives the strongest marks in eight of 11 remaining categories. Arthur Andersen's Foundation achieves highest ratings in LAN support and compatibility with the current environment. Knowledgeware's IEW/ADW, the upper CASE market leader, receives the highest rating in ability to work with other vendor's CASE tools.

User importance rating:

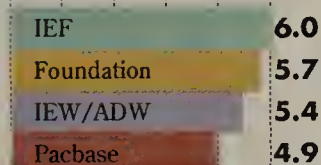
## 7.9 Responsiveness of vendor service



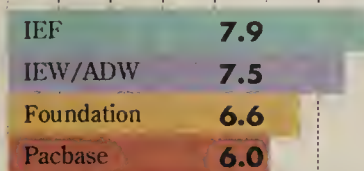
## 7.5 Efficient programming capabilities



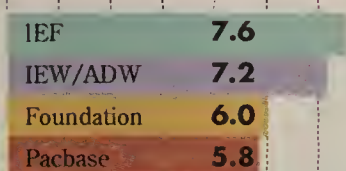
## 7.2 Training time required to use product



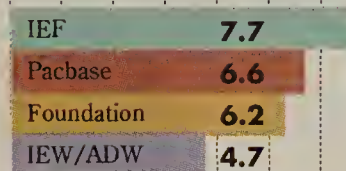
## 8.1 Planning, analysis and design features



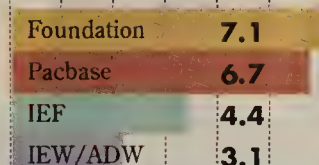
## 7.8 Overall ease of use



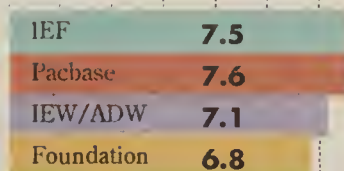
## 7.4 Effectiveness of testing



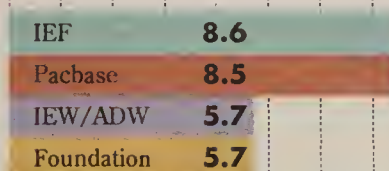
## 6.6 Support for local-area networking



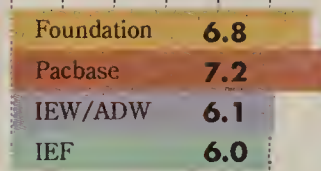
## 8.1 Quality of technical support



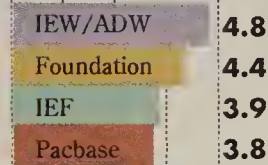
## 7.8 Code generation capabilities



## 7.3 Compatibility with current computing environment



## 5.2 Ability to work with CASE tools from other vendors



## Verbatim

What do you like best/least about this product?  
(Reasons are based on most frequently stated answers)

## IEF

## Likes

Life cycle integration/Methodology  
Effective code generation

## Dislikes

Not easy to use with other workstations/LANs  
Reporting capability

## Pacbase

## Likes

Data repository  
Life cycle integration/Methodology

## Dislikes

Steep learning curve  
Not user friendly

## IEW/ADW

## Likes

Life cycle integration/Methodology  
Methodology fits well into our system

## Dislikes

Not easy to use with other workstations/LANs  
It's slow

## Foundation

## Likes

Life cycle integration/Methodology  
Methodology fits well into our system

## Dislikes

Not easy to use with other workstations/LANs  
Too complex, cumbersome

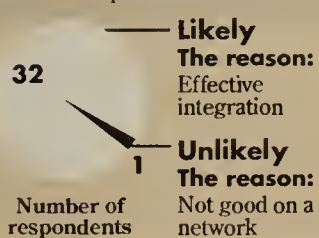
## Loyalties

How likely would you be to purchase this product again if you were making the decision today?

(Reasons based on most frequently stated responses)

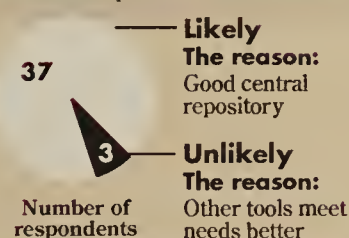
## IEF

Response base: 33



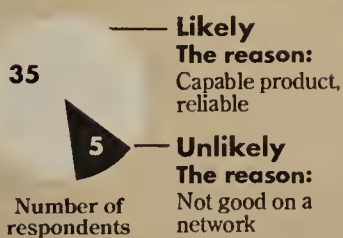
## Pacbase

Response base: 40



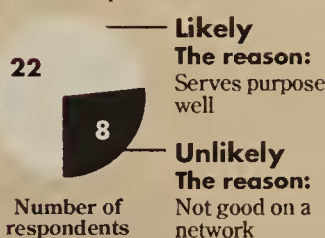
## IEW/ADW

Response base: 40



## Foundation

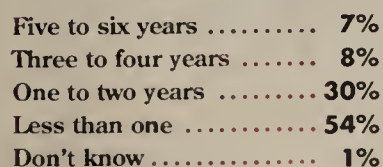
Response base: 30



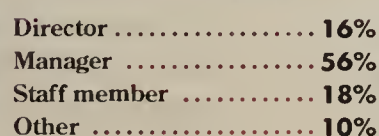
## Vital statistics

Total number of respondents: 143

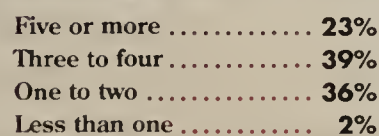
How long have applications developed with these tools been in production?



What is your position?



For how many years have you used I-CASE tools?



## METHODOLOGY

To qualify for *Computerworld's* Buyers' Scorecard on integrated computer-aided software engineering (CASE) tools, a product had to be integrated across the life cycle. In addition, the vendor had to be a market share leader in planning, analysis and design tools and/or code generation tools.

Among the products surveyed, the market share included: planning, analysis and design — Knowledgeware, Inc., 36%; Texas Instruments, Inc., 9%; Arthur Andersen & Co., 4%; code generation — CGI Systems, Inc., 13%; Knowledgeware, 8%. Figures are based on Computer Intelligence's survey of IBM/plugin-compatible mainframe or manufacturer sites.

The response base for qualifying products was as follows: TI's IEF: 33; Knowledgeware's IEW/ADW: 40; CGI Systems' Pacbase: 40; Arthur Andersen's Foundation: 30.

The survey was conducted and tabulated by First Market Research Corp. in Austin, Texas, an independent telephone research firm. Randomly chosen users were surveyed. Total weighted scores were computed by multiplying the mean importance scores users assigned to each criterion by the mean scores each user group gave its own product.

## CASE use

Thirty-six percent of the 143 respondents reported that the major benefit received from use of their particular I-CASE tools was increased quality of applications; 27% said maintenance and enhancements capability, and 24% said consistency of design.

Forty-four percent of respondents said they chose the methodology before the tools; 38% chose the tools first, and 14% chose both at the same time. Fifty-five percent said less than half of their applications development staffs were trained to use the tools.

## ACKNOWLEDGMENTS

*Computerworld* thanks the following individuals and companies for their assistance: Computer Intelligence, La Jolla, Calif.; Vaughn Merlyn and Greg Boone, CASE Research Corp., Boston; and Digital Consulting, Inc., Andover, Mass.



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# Analysis/design/code-generation tools<sup>1</sup>

VENDOR	PRODUCT	SHIP DATE OF ORIGINAL/ MOST RECENT VERSION	OPERATING SYSTEMS SUPPORTED	HARDWARE REQUIRED	RAM REQUIRED (BYTES)	FUNCTIONS PERFORMED <sup>2</sup>	SOURCE CODE LANGUAGES GENERATED	CASE METHODOLOGIES SUPPORTED	DBMS SUPPORTED	BUILDS IN NETWORK CONTROL	USER INTERFACE	NETWORKS SUPPORTED	PRICE
American Management Systems, Inc. (703) 841-6000	Life Cycle Productivity System	June 1986/Dec. 1990	DOS, OS/2, MVS, VMS	IBM PCs and compatibles, System/370, DEC VAX	640K for DOS; 6M for OS/2	Rapid prototyping, testing	Cobol	DeMarco, LPS Methodology, Yourdon	Adabas, DB2, IMS	Yes	Command line, OS/2 Presentation Manager	Netware	\$12,000 for PC; \$100,000 - \$275,000 for mainframe
Andersen Consulting (312) 507-5161 (800) 458-8851	Foundation	March 1986/Oct. 1990 - Jan. 1991 for various components	DOS, CICS, GCOS 7 and 8, IMS/DC, MVS/XA, OS/2, VMS	IBM PCs and compatibles, System/370 and 390 series; DEC 3300 through 9000 series; Bull DP 7 and 8	640K - 8M	Rapid prototyping, testing	C, Cobol	Chen, DeMarco, Korean Government Methodology, Information Engineering, Merise, Method/1, Yourdon	DB2, RDB, Sybase, Interrel, Oracle	Yes	Microsoft Windows, OS/2 Presentation Manager	LAN Manager, Netware, PC LAN Server, 3+, Starlan	\$7,000+ per module
Applied Axiomatics, Inc. (212) 643-1315	Metavision	1988/Nov. 1990	DOS, OS/2	IBM PCs and compatibles	3M	Enterprise and business modeling, rapid prototyping	C, Cobol	Gane & Sarson, IDEF, NIAM, SADT, Yourdon-DeMarco	DB2, Oracle, SQL, VSAM, RMS, Dbase	Yes	Proprietary windows, pull-down menus	CICS, TSO, AOS-VS, VMS	\$27,500 - \$40,000
Bachman Information Systems, Inc. (617) 273-9003 (800) 222-4626	Database Administrator for DB2, Analyst, Designer for CSP	Feb. 1989/April 1991	OS/2	IBM PS/2 Model 70 or higher	12M	Re-engineering	SQL	Bachman DM, entity-relationship models, SA/SD	DB2	No	OS/2 Presentation Manager	3+, LAN Manager, Netware	\$3,500 - \$15,000
CGI Systems, Inc. (914) 735-5030 (800) 722-1866	Pacbase, Paclan, Paclan/X	1983/April 1991	MVS, VSE, GCOS 7 and 8, OS/2 for Pacbase; OS/2 for Paclan; HP-UX for Paclan/X	Bull, Unisys 1100 A series and machines running MVS or VSE for Pacbase; IBM PCs and compatibles for Paclan; HP 9000 for Paclan/X	8M for Paclan	Rapid prototyping	Cobol	Information Engineering, Merise, Yourdon	DB2, Oracle, RDMS, SQL/DS, SQL/400, Teradata, RDB, Datacom/DB	Yes	Microsoft Windows, pull-down menus	Netware, LAN Manager, 3+, LAN Manager X	\$95,000+
Cadre Technologies, Inc. (401) 351-5950	Teamwork	June 1985/Jan. 1991	Unix, VMS, Ultrix, AIX, HP-UX, OS/2	HP/Apollo, DEC VAX and Vaxstation, Sun Sparcstation, IBM RS/6000	16M	Testing	Ada, C	Boeing-Hatley, Buhr Ada, Yourdon-Constantine, Yourdon-DeMarco, Ward-Mellor, Schlaer-Mellor	Proprietary	NP	DEC Windows, Sunview, pull-down menus	NFS, TCP/IP, Decnet, Netware	\$6,500+
Cadware, Inc. (203) 397-2908 (800) 223-9273	System Developer I	May 1988/Dec. 1990	DOS	IBM PCs and compatibles	1M - 1.5M	None	Cobol	Constantine, DeMarco, Gane & Sarson, Schlaer/Mellor, entity-relationship models, state transition, project hierarchy	Dbase III and higher	No	Command line, pull-down menus	Netware	\$499 for single-user version
Cincom Systems, Inc. (513) 662-2300 (800) 543-3010	AD/Advantage	March 1990/March 1991	MVS/XA, MVS/ESA, VSE/SP2	IBM 3080, 3090, 4300, 9370 and compatibles	NA	Documentation, maintenance, project planning, rapid prototyping, testing	Mantis	Information Engineering, IDEF, Merise, SDM, SSADM	Supra, DB2, SQL/DS, VSAM	No	Command line, proprietary windows, pull-down menus	Any supported by DOS, OS/2	\$50,000 - \$300,000
Cognos, Inc. (617) 229-6600 (800) 426-4667 Ext. 81	Powercase, Powerhouse	June 1990/Dec. 1990	VMS	DEC Vaxstation	16M	Documentation, rapid prototyping, testing	Powerhouse 4GL, SQL	Entity-relationship models, data flow diagrams	RDB, Powerhouse Starbase, any ANSI-standard SQL database	No	Decwindows	Decnet	\$15,000 for single copy
Computer Associates International, Inc. (516) 227-3300	CA-DB: Generator/PC, DB: Architect	April 1986/Nov. 1990 for DB: Generator; Jan. 1988/Sept. 1990 for DB: Architect	DOS	IBM PCs and compatibles	640K	Rapid prototyping, testing, database design	C, C++, Pascal, Fortran	Chen, entity-relationship models, data models	IDMS	Yes	Command line, pull-down menus	None	\$4,000 for DB: Generator; \$8,000 - \$12,000 for DB: Architect
Computer Systems Advisers, Inc. (201) 391-6500 (800) 537-4262	Pose	July 1988/NP	DOS	IBM PCs and compatibles	640K	Database schema generation	Cobol	Gane & Sarson, Yourdon	DB2, SQL/DS, Oracle, Focus, OS/400 Relational database, Adabas	No	Pull-down menus	Any Netbios-compatible	\$595 - \$6,595
Iconix Software Engineering, Inc. (213) 458-0092	Powertools	1985/4Q 1990	Macintosh OS, DOS, Sun OS	Macintosh, IBM PCs and compatibles, Sun Sparcstation	1M	Rapid prototyping, testing	Ada, C, C++, Cobol, Fortran, Pascal	Buhr/Booch, Chen, DeMarco, Martin, Schlaer/Mellor, Yourdon	CDIF	Yes	Microsoft Windows, proprietary windows, pull-down menus, X Window	Appleshare, Tops	\$995 or \$1,995 per module; \$6,995 for entire set
Interactive Development Environments, Inc. (415) 543-0900 (800) 888-4331	Software Through Pictures	March 1985/Nov. 1989	AIX, DG/UX, Domain OS, HP-UX, Iris, Mips RISC OS, Sony News, Sun OS, Ultrix, VMS	DG Avion; Decstation 2000, 3000, 5000, Vaxstation 3000; HP/Apollo 9000 series 300, 400, 700, 800, DN2500 through 4500; IBM RS/6000; Mips Magnum 3000; Sony News; Sun 3, 4, Sparcstation	8M	Rapid prototyping, testing, database schema generation	Ada, C, C++, Cobol, Pascal	Chen, Constantine-Yourdon, DeMarco-Yourdon, Gane & Sarson, Hatley-Pirbhai, Jackson, Wasserman-Pircher	DB2, Informix, Ingres, Interbase, Oracle, Sybase, Troll, any ANSI-standard SQL database	Yes	X Window, Motif, Open Look	Any supported by Unix	\$5,000 - \$21,000
Intersolv, Inc. <sup>3</sup> (301) 230-3200 (800) 582-1601	APS, PVCS, Excelsior, Design Recovery	1984/March 1991	DOS, OS/2, AIX, MVS, DOS/VSE, OS/400	IBM PS/2 and compatibles, RS/6000, 3090 series	500K	Configuration management, maintenance, rapid prototyping, re-engineering	Cobol	Information Engineering, Yourdon, data-driven, object-oriented	IMS, IDMS, VSAM, ANSI-standard SQL database	Yes	Command line, Microsoft Windows, proprietary windows, pull-down menus, OS/2 Presentation Manager	Netware, LAN Manager, OS/2 LAN Server, Vines, Netbios	\$495 for single-user PVCS; \$8,250 for APS; \$8,600 for Excelsior; \$8,600 for Design Recovery
Knowledgeware, Inc. (404) 231-8575 (800) 338-4130	Application Development Workbench	March 1990/Dec. 1990	OS/2 Version 1.2 and higher	IBM PS/2 Model 70 or 80	8M	Rapid prototyping, strategic systems planning	Cobol	Methodology-independent	DB2, IMS, IDMS, VSAM	No	OS/2 Presentation Manager	OS/2 LAN Server	\$10,125 per workstation; \$20,000 for starter set
MFJ International (312) 335-8899	Supercycle	Nov. 1988/March 1991	VSE, VM, MVS, DOS, OS/2	IBM PCs, mainframes and compatibles	8M	Rapid prototyping, testing	CA-Ideal	Information Engineering, SDM-70, Yourdon-DeMarco, proprietary	DB2, CA-Datcom	No	Command line, Microsoft Windows, pull-down menus	Any supported by VTAM, LU6.2	\$50,000 - \$250,000
McDonnell Douglas Systems International (314) 233-2635 (800) 225-7760	Prokit Workbench, PRO-IV	1987/1991	DOS, Unix, MVS, VMS	IBM PCs and compatibles, AS/400, 3080, 3090, 4300 series, HP 9000, DEC VAX, AT&T 3B2, Altos 1000/2000, Prime EXL	640K	Rapid prototyping	Proprietary routine library	Chen, Gane & Sarson, IDEF, Stradis	DLI, DB2	No	Proprietary windows	Netware, Vines, OS/2 LAN Server	\$35,000 for 5-user Workbench; \$2,000 - \$150,000 for PRO-IV

<sup>1</sup>All CASE environments listed perform analysis, design and source-code generation for building business applications. Each vendor sells all the required components for its environment; no third-party products are required, and integration techniques vary. <sup>2</sup>All products perform analysis, design and code generation. Additional functions are listed in the chart. <sup>3</sup>Formerly Index Technology Corp. and Sage Software. <sup>4</sup>Pansophic's Telon/Teamwork is a version of Cadre Technologies' Teamwork, with functions added specifically for use with Pansophic's Telon products. Telon/Teamwork is available only through Pansophic.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.



VENDOR	PRODUCT	SHIP DATE OF ORIGINAL/ MOST RECENT VERSION	OPERATING SYSTEMS SUPPORTED	HARDWARE REQUIRED	RAM REQUIRED (BYTES)	FUNCTIONS PERFORMED <sup>2</sup>	SOURCE CODE LANGUAGES GENERATED	CASE METHODOLOGIES SUPPORTED	DBMS SUPPORTED	BUILDS IN NETWORK CONTROL	USER INTERFACE	NETWORKS SUPPORTED	PRICE
Manager Software Products, Inc. (617) 863-5800	Method Manager	July 1990/ March 1991	DOS, MVS	IBM PS/2, 9370, 4300, 3080, 3090, ES/9000 series	2M minimum	Rapid prototyping	Cobol, CSP-ESF	Information Engineering	DB2, SQL/DS	Yes	Microsoft Windows	None	\$120,000 +
Michaels, Ross & Cole Ltd. (708) 916-0662	MRC-Productivity series	June 1988/Sept. 1990	OS/400	IBM AS/400	NA	Rapid prototyping	RPG/400	Software Engineering, Rapid Application Development	OS/400 relational database	Yes	Command line, proprietary windows, pull-down menus	Any supported by Ethernet, Token Ring	\$5,000 - \$39,500
	MRC-Query series	Feb. 1983/Oct. 1990	CPF	IBM System/38	NA	Rapid prototyping	RPG-III	Software Engineering, Rapid Application Development	CPF database	Yes	Command line, proprietary windows, pull-down menus	See above	\$4,000 - \$15,000
Oracle Corp. (415) 506-3267	Oracle CASE	1986/1990	VMS, Unix, OS/2, DOS, MVS, VM, AIX	Any hardware that supports operating systems listed	8M	Database and index design, reverse engineering	Oracle SQL and Forms	CASE Method, Gane Sarson, Information Engineering, Systems Engineering	Oracle SQL, DB2	Yes	Decwindows, OS/2 PM, pull-down menus, X Window	Oracle SQL Net	\$5,000 - \$100,000 +
Pansophic Systems, Inc. (708) 505-6000 (800) 323-7335	Telon/Teamwork <sup>4</sup> , Telon, Telon Plus	1982/April 1991 for various components	OS/2, DOS, MVS, DOS/VSE, OS/400	IBM PS/2 Model 70, AS/400, mainframes	8M	Rapid prototyping	Cobol, PL/1	Buhr, Chen, Constantine-Yourdon, DeMarco-Yourdon	DB2, IDMS, IMS, VSAM	Yes	Proprietary windows, pull-down menus, command line	3+, Netware, PC LAN, LAN Server	\$2,250 - \$12,500 for Telon Plus; \$9,000 for single-user Telon/Teamwork; \$150,000 - \$350,000 for Telon
Scandura Intelligent Systems (215) 664-1207	Prodoc RE/NU Sys Workbench	1990/1991	DOS, Unix	IBM PCs and compatibles, RS/6000, Sun Sparcstation	2M minimum; 4M - 8M recommended	Rapid prototyping, testing, specific language support, reverse engineering	Ada, C, Cobol, Fortran, Pascal	Methodology-independent	Exports to any	Yes	Command line, pull-down menus, X Window, dialog boxes	Any supported by DOS or Unix	\$12,600
S/Cubed, Inc. (203) 323-0760	The Developer's Assistant for Information Systems	Nov. 1988/ March 1991	DOS	Intel 80386- and I486-based IBM PCs and compatibles	4M	Business requirements definition, rapid prototyping, testing	C, Cobol	Methodology-independent	Proprietary SQL-based	Yes	Microsoft Windows	Any supported by Windows 3.0	\$6,000 - \$36,000
Seer Technologies, Inc. (212) 643-6000	High Productivity Systems	Q4 1987/March 1991	DOS, OS/2, MVS	IBM PS/2, 3090 series	6M on PS/2	Migration, version and change control, rapid prototyping, testing	C, Cobol	Information Engineering	DB2, DBM	Yes	Microsoft Windows, OS/2 Presentation Manager	IBM Communications Manager	\$10,000/month license fee
Softlab, Inc. (415) 957-9175	Maestro II	1975/1990	DOS, Unix	IBM PCs and compatibles, RS/6000, HP 9000	640K on PC; 24M on server	Maintenance, rapid prototyping, re-engineering, testing	Cobol	Merise, SA/SA, SSADM, Setec	Proprietary Object Management System	Yes	Proprietary windows, pull-down menus	Any supported by TCP/IP	\$15,000 per workstation
Software AG of North America, Inc. (703) 391-6720	Predict CASE and Predict CASE Workstation	March 1990/ April 1991	MVS, DOS/VSE, VMS for Predict CASE; DOS for Workstation	IBM 4300, 3080, 3090 series and compatibles; Wang for Predict CASE; IBM PC AT and compatibles for Workstation	1.5M for workstation	Rapid prototyping, testing	Natural	Information Engineering	Adabas, DB2, IMS, VSAM, SQL/DS	No	Command line with proprietary windows	None	\$8,800 - \$252,000
	Natural Architect and Natural Construct	1988 for Construct, 1989 for Architect; Feb. 1991 for both	Macintosh OS for Architect, MVS, DOS/VSE, VM, VMS for Construct	Macintosh SE, II for Architect; IBM 4300, 3080, 3090, 9300 series and compatibles; DEC VAX; Wang	1M for Architect	Rapid prototyping, testing	Natural	Chen, Gane & Sarson, Martin, DeMarco-Yourdon	Adabas, DB2, VSAM, SQL/DS	No	Macintosh on Architect; proprietary windows on Construct	None	\$8,000 for single copy of Architect; \$3,000 - \$77,800 for Construct; \$4,200 - \$36,000 for required gateway
SPS Software Products & Services, Inc. (212) 686-3790	EPOS	1979/Dec. 1989	VMS, Unix, DOS	DEC VAX, Sun-3, HP 9000, IBM PCs and compatibles	640K	None	Ada, C, Fortran, Pascal	Methodology-independent but does support object-oriented schemes	Proprietary	Yes	X Window	None	\$9,775 - \$25,000
Synon, Inc. (415) 461-5000	Synon/2E	July 1987/ March 1991	OS/400	IBM AS/400, all models except Y10	4M	Rapid prototyping, testing, data modeling, action diagramming	Cobol, RPG/400	Information Engineering	OS/400 relational database	No	Command line, proprietary windows, pull-down menus	Any supported by LU6.2, Token Ring	\$48,000 - \$89,000
Syscorp International (512) 338-5800	Microstep Version 1.5	Jan. 1990/Jan. 1991	DOS 3.1, 3.3, 4.0 required to generate applications	IBM PCs and compatibles	640K	Rapid prototyping, testing	C	Rapid Application Development	Btrieve, Dbase	Yes	Proprietary windows	See above	\$7,500
System Software Associates (312) 641-2900	As/Set ADK, As/Set Integrator	Jan. 1990/ March 1991	OS/400, OS/2	IBM AS/400, PS/2	8M	None	RPG/400	Information Engineering	OS/400 relational database	No	Command line, proprietary windows, pull-down menus	Any supported by OS/2, OS/400	\$17,000 - \$80,000
Texas Instruments, Inc. (800) 527-3500; Outside North America, call local TI office	Information Engineering Facility	1987/1990	DOS 3.1 and higher, OS/2 Extended Edition 1.2 and higher	IBM PCs and compatibles	640K	Rapid prototyping, testing	C, Cobol	Information Engineering	DB2, OS/2 DBM, RDB, Oracle	No	Proprietary windows	None	\$9,400 - \$23,800
Uniays Corp. (215) 986-4011	The Line Environment	Dec. 1985/Dec. 1990	Unix System V, Unisys A series MCP/AS, V series MCP, OS1100, OS/2, DOS	Unisys U, A, V, 1100/2200 series, PW2	5M	Rapid prototyping	Cobol	Linc, data-flow diagrams, entity-relationship models	Oracle 6.0, A and V Series DMS II, 1100/2200 RDMS	Yes	Command line, Microsoft Windows, OS/2 Presentation Manager, pull-down menus	Any supported by Unix	\$5,500 - \$100,000 for Unix version; \$30,000 - \$322,000 for A or V series; \$104,000 - \$258,000 for 1100/2200 series
Westmount Technology b.v. (818) 597-9119	ISEE, TSEE, RTEE	Oct. 1988/Oct. 1990	Unix, VMS, Ultrix, Sun OS, HP-UX, Dymix, OSX, Clix	Sun-3, Sun-4, DEC VAX, 3100, HP 9000 Series 800 and 700, Intergraph Clipper, IBM RS/6000, DG Avion	16M - 24M	Reverse engineering	C, AGL	Chen, Constantine, DeMarco, Jackson, Ward-Mellor, Yourdon	Ingres, Informix, Unify, Sybase, Oracle	Yes	X Window, Motif	Any supported by NFS, TCP/IP	\$5,000 per module



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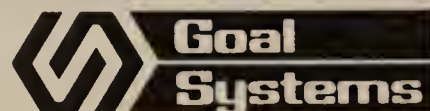
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## Object lesson

*Understanding the principles behind object-oriented technology is the first step toward reaping its benefits of code reuse and ease of maintenance*

BY DANIEL TASKER

**O**ptimists see object orientation as the next silver bullet. Pessimists see it as the next arrow in the chest of pioneers. Somewhere between these two extremes lies reality.

Information systems professionals have a lot to gain from finding that middle ground: improved requirements and analysis methods, code reusability and ease of applications maintenance. These features can offer considerable relief from development backlogs and maintenance burdens.

However, achieving such object-oriented benefits is not easy; this approach to designing and building applications requires changing mind-sets. Nor do benefits accrue overnight. While off-the-shelf tools that support generic objects such as windows and lists do exist, there is still a need for in-house analysis and development for the specific objects a business needs. Object-oriented work will require close to traditional development time frames at first.

### Object principles

To understand the positives and negatives of object-oriented analysis, design and programming, it is necessary to understand that it operates under different principles than the software development environments that have come before. It also has its own terms (see glossary page 84).

Traditional development has focused primarily on function or what the system does. In a function-based view, program logic is composed of instructions that emulate what people do. In this function-oriented world, data is usually structured in any way necessary to make the system execute its code in the shortest time possible.

It's true that IS shops get their tailored code to execute faster, but the legacy of developing systems from a purely functional

perspective is a tangle of production applications and databases. This mess has become difficult, if not impossible, to manage. It is time to shift focus.

Objects represent a new way of looking at programs. Rather than seeing a system purely on the basis of what it does, object orientation looks at the elements (objects) involved. Each object within the system is analyzed to establish what it knows (data) as well as what it should do (function). Objects interact with other objects only by sending messages, similar to subroutine calls. These

sible the reuse of code. Typically, when reuse is mentioned in relation to object orientation, it refers to the practice of arranging objects into class (or type) hierarchies, through which they inherit knowledge and action properties. Therefore, for example, logic for "hiring" different subtypes of "employees" (such as "secretary," "engineer" and "salesman") does not have to be either called or copied. Logic is established once for the "employee" object and is inherited (re-used) by the other subtypes.

### Inherited data

Inheritance works for data components of objects in the same way as for action or functional components. "Secretary," "engineer" and "salesman" inherit "name" and "hire date" from the "employee" object. The object-oriented system automatically makes them available to all of the subtype objects.

Reusing business objects across applications is where IS can realize the greatest productivity improvements; reuse obviates the need to build code from scratch every time.

Reuse through inheritance is different from more traditional forms of subroutine libraries in which members of such libraries typically perform

special functions, such as date conversion or statistical calculations. There are two difficulties with this traditional setup. First, code intended to be called as a stand-alone routine requires special effort to properly structure it. Second, organizing significant numbers of members (more than 50) in subroutine libraries is not easy. Functions are difficult to classify on their own.

It is typically faster to recode simple functions than to spend time searching for one that exists within a list of tens or sometimes hundreds of callable routines.

Action properties within objects, on the other hand, are always designed to be

*Continued on page 80*



Katherine Mahoney

messages request information from or action by other objects.

Two types of objects in a banking system, for example, might be "customer" and "account." Each "customer" object knows its name, address and so on. "Customer" objects perform actions such as "make deposit" and "make withdrawal." "Account" objects know their "balance" and "interest rate" and perform tasks such as "calculate interest" and "produce a bank statement." A "customer" object wanting to know an account balance sends the message "tell balance" to the appropriate "account" object, which acts on the message.

This object-oriented approach makes pos-

- A shift from function view to data view
- Firms implement what they can
- A glossary of object-oriented terms

Tasker is a Sydney, Australia-based independent consultant and author of the book *Fourth Generation Data*.



Continued from page 79

callable. Access to an object's knowledge or actions can be obtained via messages, with inheritance hierarchies providing a natural classification structure. Thus, besides providing automatic reuse through inheritance, these structures aid in locating functions for reuse via messages.

#### Reuse instances

Reusing only the definitions of objects (their knowledge and action properties) is not sufficient. Advantages of object orientation can be lost if object instances are not reused as well.

For example, a university might develop a course enrollment application that includes the "person" hierarchy and populate it with subtype instances of

"students" and "faculty," along with their relationships to other objects such as "course." A second project team at the school developing a payroll application can copy the "person" hierarchy. The team can take advantage of reusing the definition of "person" and "faculty," adding a new "staff" subtype.

However, if the payroll application is run on a different computer, it will not be able to directly reuse the object instances found in the course enrollment application. It will require either redundant entry of faculty information and duplicate updates over time or additional extract and update transaction mechanisms between it and the enrollment systems.

This is the same kind of situation that results in redundant data in application-

specific databases and end-user query tables that support traditional function-based applications. IS can reduce initial development time by reusing (copying) existing object definitions, but in the long run, these new applications will experience the same kinds of problems found in today's production systems.

#### Not a recognized problem

Instance reuse has not yet been widely recognized as a problematic issue in the object-oriented community, perhaps because groups experimenting with object orientation have done so only on a pilot application basis in which no programs overlap. Clearing up these traditional types of problems, however, is important in taking full advantage of object orienta-

tion's maintenance strengths.

Program complexity and interdependency are two of the major issues affecting program maintenance. Complexity relates to the additional time needed to locate the appropriate code for a required change. Spaghetti code, clever logic and heavily modified programs all contribute to slowing this search. Structured techniques are intended to address the complexity problem, but the majority of production applications have not been developed using these techniques.

Program and/or systems interdependency (the passing of transactions or even whole databases between systems) means maintenance staff members must spend additional time identifying the potential ripple effects of a program change. With many of today's larger (and older) applications, it has become impractical, if not impossible, to do thorough impact analysis. Standard practice in many shops is to take care of the most obvious cases and then let the program run. A team is usually kept close by to fix whatever fails.

This is not a pretty situation but a reality nonetheless.

What object orientation has to offer in this area is encapsulation based on data-

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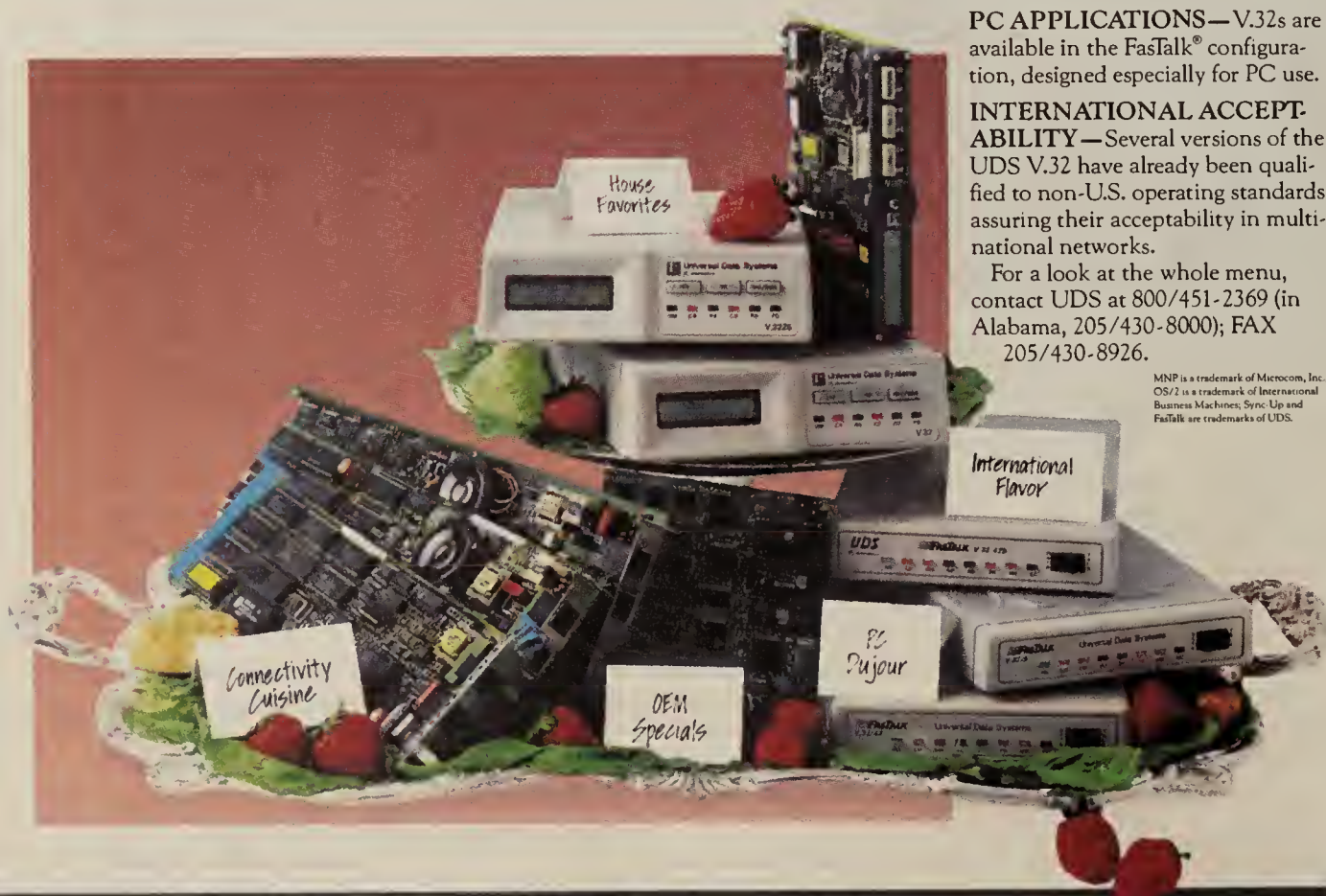
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## Implementing bits and pieces

Object-oriented technology is not just a lot of hype. Even without industrial-strength languages and database management systems, companies are applying object-oriented principles to analysis, design and even implementation.

Westpac Banking Corp. in Sydney, Australia, captures user requirements in the form of business objects for its redevelopment of core banking applications. Implementation of those objects is being accomplished using IMS and Cobol. The firm has committed more than \$100 million (Australian) to this multiyear development project.

By performing extensive object-oriented analysis on its banking products, the organization expects to be able to mix and match product features implemented as reusable objects. Reusing objects will enable Westpac Banking's IS department to develop applications in days and weeks instead of weeks and months.

New Zealand Insurance, also based in Sydney, is using traditional languages and database technology to implement support tools for delivering applications based on object-oriented principles. Early tests indicate these tools will be able to offer tailored insurance applications in a greatly reduced time frame.

However, companies currently having success in the object-oriented field have had to invest significant time, money and effort. Companies implementing applications using object-oriented languages and DBMSs have had to accept the risks that come with an emerging technology: few standards or off-the-shelf products and vendors with short track records.



centered objects. Encapsulation is basically a fancy term for surrounding all knowledge properties with action properties. Objects are isolated from one another. An object needing to find out what some other object knows or to change that knowledge is not permitted to access (read or update) the data directly. It must send a message asking for the information.

Objects, therefore, have "telling" actions as well as "update" actions for each of their knowledge properties. Although this may sound a bit tedious, it allows for maintenance changes to objects without impacting other objects.

In the case of updates to knowledge properties, other objects may send information relevant to the update, but only the object containing the knowledge has the logic to implement the update. This guarantees that maintenance will be required only in a single, well-classified location.

Instance reuse, in which one application copies object definitions for its own use, creates a situation that can violate encapsulation, however. Even if a single database were shared by

are in their earliest stages.

IS organizations' understanding of object-oriented concepts is not much more advanced.

Even so, some organizations are taking advantage of what object orientation can offer today (see story previous page). Some companies are applying it to stand-alone applications. Others that understand the benefits of enterprisewide data sharing are

using it to share/reuse functions through object-oriented style hierarchies and encapsulation.

IS shops can benefit today from object-oriented principles without risking existing production technologies. The first step is to increase the understanding of the concepts.

The study of object orientation should be approached not only from the function perspec-

tive but also from the data perspective. Because they take a data-centered perspective on systems in which they identify entities (persons, places and things), data analysts and data modelers make an easier transition to the idea of "objects." Their experience can help companies organize the enterprise's data along object-oriented rather than function-specific lines.

Requirements for new systems expressed from the perspective of objects can be useful, even when implementing applications in traditional nonobject-oriented languages and database technologies.

Beginning to structure such applications using object-oriented principles can only help in delivering reuse and maintenance benefits to companies. •

**O**BJECT-ORIENTED technology is about where relational database management systems were eight to 10 years ago.

both applications, there is now more than one source of logic that delivers or updates the same fact. Maintenance to only one of these copies would mean the fact could be operated on by different logic.

To prevent this, the exact same changes must be applied to all copies of object definitions. Locating and changing two or more copies obviously increases maintenance time and effort. IS will require some form of documentation procedure to keep track of exactly which systems have taken copies of which object definitions.

#### What can be done today?

Although object orientation has been around for many years, it is only recently that it has received major attention from vendors and methodologists. The technology (programming languages and object-oriented database management systems) is about where relational DBMSs were eight to 10 years ago. Some promising products are available, but none are considered "industrial strength" or "strategic" enough for major business applications. Furthermore, object-oriented language standards

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# Term paper: An object-oriented glossary

**Object/instance:** An individual item of interest in the system. For example, in a banking system, each customer (Jones, Smith and so on) is an object, or instance of an object type (or class), of customer. Each account, statement, etc., is an object or an instance of its type.

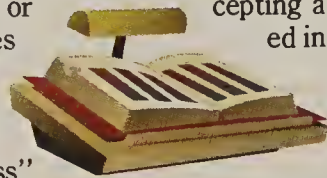
**Object class/class/object type:** A generalization of the objects (or instances) of interest in a system. The generalization is based on all of the instances having common properties. "Customer" is the object class for the objects Jones and Smith, each of which has a name and ad-

dress and performs similar actions.

**Object property/feature/attribute/method:** A component of an object (type) that either represents something that the object knows (such as a knowledge or data property) or something that the object does (such as an action the object is capable of carrying out). Thus, for the object class "customer," "name" and "address" are the knowledge properties, and "make deposit" and "make withdrawal" are the action properties.

**Message:** A request issued by an object for another object to respond to. This response can take the form of supplying a piece of information, such as returning a customer's name to the message sender, or initiating some action, such as accepting a withdrawal amount included in a "withdraw" message and updating a balance.

All interaction among objects is via messages. The name of the message must match the name of the receiving object's action property or an action the object inherits from some-



where higher in its class hierarchy.

**Class hierarchy/type hierarchy:** A relationship structure in which one object is identified as a special case of another. For example, a "customer" is a special case of "person," and a "savings account" is a special case of "bank account." Objects inherit properties (knowledge and actions) from all general objects above them in the hierarchy. The immediate "parent" of an object in a hierarchy is called the supertype of the object. The immediate "child" of an object is called a subtype.

Many object-oriented systems allow for an object to have more than one parent, enabling it to "inherit" upward through more than one structure.

**Inheritance:** A feature of object orientation that automatically makes available to a given object any properties of objects above it in a type hierarchy. Thus, a "student" object is considered to have "name" and "address" properties, which are actually defined as part of its supertype, "person."

**Encapsulation:** A limitation imposed on objects whereby knowledge properties are directly accessible only by action properties of the same object. Any other object wishing access can only do so indirectly by sending a message. This message is serviced by the appropriate action property, which provides the required information. For example, an account balance can be provided to message senders through a "tell balance" account action.

**Polymorphism:** Means "taking many forms." Different action properties of different object types are allowed to have exactly the same name. Thus, two or more subtypes of an "account" object (for example, term deposit, Christmas club and so on) can each have an action property "calculate interest," with the logic within each being appropriate to that type of account.

Polymorphism provides for different objects to respond differently to the same message, depending on the object type that receives it.

**Dynamic binding:** A special program execution feature that waits until the last minute to determine exactly which action property in which object to send a message to (also referred to as branching). With static binding, the branch destination is fixed when the program is compiled.

Because of polymorphism in object orientation, a message with a given name may actually want to access different actions (program logic), depending on the particular object type being processed at the time. In this case, dynamic binding is required so the appropriate action is invoked when each type is determined.

**Persistence:** A state in which an object's knowledge is required to remain intact when the object-oriented system is not active. Traditional records in databases are persistent; instances of window objects are not. When the system is shut down, the window ceases to exist. A new instance is established when the application is activated again.

So, although a window for accepting customer address details is not persistent, the details as part of the customer instance are.

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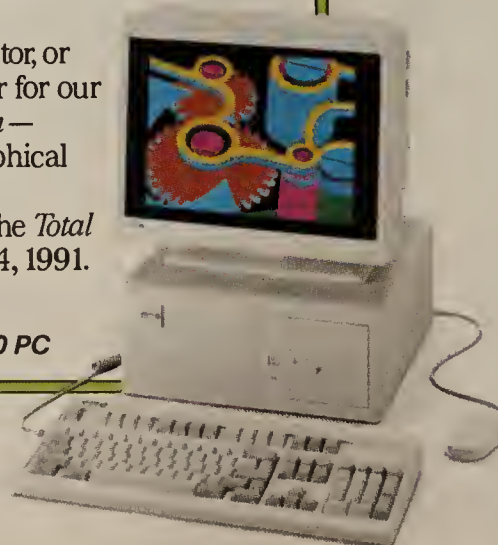


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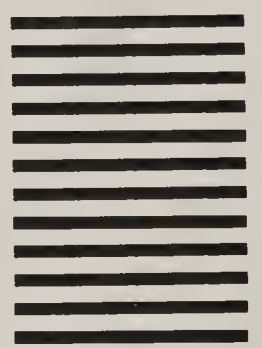
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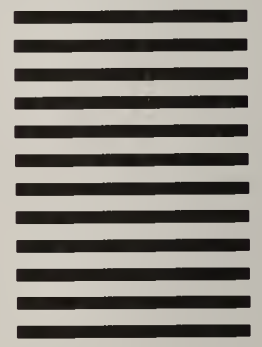
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# COMPUTER INDUSTRY

## NATIONAL BRIEFS

### JDC gets some R&R

► **Reynolds and Reynolds Co.**, the Dayton, Ohio-based purveyor of computer systems to automobile dealers, inked an agreement last week to buy the assets of neighboring **NCR Corp.**'s **JDC Data** subsidiary. Based in Vejle, Denmark, JDC Data supplies computer systems to the Scandinavian — and, more recently, the German — automobile markets as well as to gas stations, lumberyards and accounting firms. It also supplied \$52.3 million in revenue to NCR in 1990. Terms of the deal were not disclosed.

### Bull N?

► French computer firm **Groupe Bull** last week bought out former partner **Honeywell, Inc.**'s remaining 12.8% interest in **Bull HN Information Systems, Inc.** The long-planned move completes Honeywell's exit from the computer industry and gives Groupe Bull an 85% stake in the Billerica, Mass.-based Bull HN. Japan's **NEC Corp.** — the N in Bull HN — remains a 15% owner of the firm. Honeywell said last week it would remain on board as a key Bull customer.

### Sterling deal

► The slimming of **Control Data Corp.** continued last week as the Minneapolis-based computer vendor poised to sell its Redinet Services division to Dallas-based **Sterling Software, Inc.** Redinet, an electronic data interchange (EDI) network services and software supplier, will join the EDI Group, which Sterling said is the fastest growing part of its business. Both firms said they expect the deal to close by the end of June.

### Ready, steady, go public

► Smart-hub manufacturer **Chipcom Corp.** recently made prophets out of those analysts who have numbered the company among those most likely to launch an initial public offering this year. The Southboro, Mass.-based firm went public on March 22 at \$10 to \$12 per share. Proceeds from the sale of the initially offered 1,550,000 shares of common stock will be used for general corporate purposes including product development, Chipcom said.

## Banyan: Make-or-break time

*Enterprise networking pioneer's technological leadership on the line*

### ANALYSIS

BY JOANIE M. WEXLER  
CW STAFF

WESTBORO, Mass. — To say that Banyan Systems, Inc. should be watching its marketing p's and q's these days would be putting it mildly.

Banyan, historically lauded for its technology leap in enterprisewide networking but chided for its lack of marketing acumen, might soon hit a brick wall if it does not quickly come through with some fancy marketing and development footwork, analysts and users said recently.

Some questioned whether the 550-person, privately held company is moving fast enough to allow it to thrive much longer without being purchased by a major industry player.

"The biggest question mark is how long Banyan can survive with just a sliver of market share," said Janet L. Hyland, director of network strategy service at Cambridge, Mass.-based Forrester Research, Inc. A recent Forrester study of Fortune 1,000 firms revealed "a strong jitteriness" about Banyan's vi-

bility as a company because of its size, despite widespread enthusiasm for its Virtual Networking System (Vines) network operating system, Hyland said.

Banyan has long had a head start in enterprise networking with its AT&T Unix System V-

to communicate directly with remote computers over wide areas without having to know and specify their precise locations.

To date, Streettalk remains unchallenged in the industry, but competitors are said to be scurrying to roll out similar naming

Banyan's mission, analysts said, should be to listen to the market and act fast on what it hears. For example, customers at the recent Association of Banyan Users meeting in Montreal said large-account-oriented Banyan must start selling into smaller accounts to build "mind share" [CW, April 15].

Users are also demanding Vines interoperability with other vendors' LANs and support of many more computing platforms as "clients" — computers that request data and services from Vines' Unix-based servers.

"Banyan has barely gotten off its own proprietary hardware," said Frank Michnoff, program director of desktop computing strategies at The Meta Group, Inc. in Westport, Conn.

### Making progress

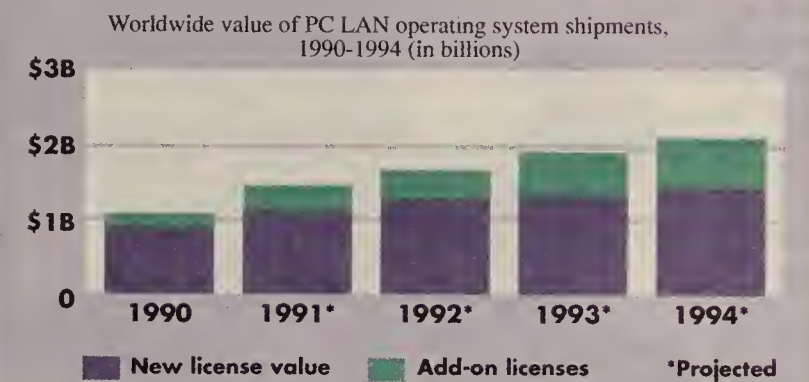
With the release of Vines Version 4.10 at the Montreal conference, the network is making progress. Vines 4.10 added OS/2 client support along with further integration of Microsoft Corp. Windows environments to existing MS-DOS clients. Support for Apple Computer, Inc. Macintosh clients is next on Banyan's list, according to the firm.

In contrast, Novell's Netware LAN has long supported DOS, Windows, OS/2, Unix and Macintosh clients — which makes

*Continued on page 86*

It's now or never if Banyan is to make it big

*In the high-growth LAN operating system market, Banyan Systems, Inc. must move fast to avoid being trampled*



Source: International Data Corp.

CW Chart: Doreen St. John

based Vines. The network boasts a global naming service, known as Streettalk, that lets geographically dispersed Vines local-area networks plug into one another. This enables users

services within 18 months. They are also enhancing networking software and forming partnerships to challenge Vines in the enterprise market (see story page 86).

## Q1: Upbeat results indicate promise instead of disaster

BY NELL MARGOLIS  
CW STAFF

IBM's first-quarter fall from earnings grace [CW, April 15] earlier this month wreaked havoc on Wall Street and set industry observers dourly speculating as to how bedraggled other recession-wracked companies' quarterly reports might appear. However, a slew of upbeat first-quarter results posted by computer companies last week indicated that despite a grim preview of coming attractions, the year's opening quarter may turn out to be a good show.

"We've seen upside surprises already, and I've got a sneaking suspicion we're in for more," said Joseph Payne, an analyst at Alex. Brown & Sons, Inc. For instance, he noted, "People forget that in a recession, peripherals do better than computers."

Louisville, Colo.-based storage and retrieval systems purveyor Storage Technology Corp. saw revenue increase 9% to \$282 million for the quarter,

while net income swelled 73% to \$15 million.

San Jose, Calif.-based Conner Peripherals, Inc.'s net income for the quarter ended March 31 soared 127% to \$35 million on revenue up 62% to \$382 million.

In addition, several analysts pointed out, the same recession-induced fears that make customers clutch their wallets also sharpen their appreciation of assets that endure or that protect other assets. Healthy first-quarter figures are expected from Stratus Computer, Inc., Payne said, owing to the fact that "their fault tolerance is real, and their customers know it."

During hard times, emphasis also shifts to service, analysts said. At Roseland, N.J.-based Automatic Data Processing, Inc., for example, employer services — which contribute some 60% of the firm's bottom line — enjoyed double-digit year-to-year growth in the first quarter, fueling the firm to a 14% increase in earnings per share and its 119th consecutive quarter of

### First-quarter earnings 1991

*Recession equals arduous times for computer makers while peripherals manufacturers tally profits*



Company	Revenue Jan. through March 1991	Percent change from 1990	Profit Jan. through March 1991	Percent change from 1990
Apple Computer, Inc.	\$1.6B	19%	\$131M	(.5%)
AST Research, Inc.	\$180M	31%	\$17M	74%
Automatic Data Processing, Inc.	\$490M	4%	\$70M	7%
Borland International, Inc.	\$70.8M	103%	\$8.4M	102%
Cray Computer Corp.	\$83M	—	\$12.5M	—
Cypress Semiconductor Corp.	\$69.1M	31%	\$9.1M	9%
Diebold, Inc.	\$113M	(.4%)	\$5.2M	(34%)
Intergraph Corp.	\$287M	25%	\$19.9M	33%
NCR Corp.	\$1.4B	8%	\$46M	(12%)
Pyramid Technology Corp.	\$58M	44%	\$5M	35%
Sequoia Systems, Inc.	\$16.2M	21%	\$2M	56%
Tandon Corp.	\$113M	7%	\$8M	12%
Texas Instruments, Inc.	\$2B	7%	\$(54M)	—
United Telecommunications, Inc.	\$2.2B	7%	\$84M	(22%)

Parentheses indicate a reduction or loss

CW Chart: Doreen St. John

10% or better earnings-per-share growth.

Meanwhile, many of the quarter's happier tales serve as a reminder that rolling out new and needed products — on time and

at the right price — is a winning gambit in good and bad times alike, said David Wu, an analyst at S.G. Warburg & Co. "Another is sound management with a talent for cost control," he added.



## Banyan

CONTINUED FROM PAGE 85

Netware appealing to a broader group.

"Users are looking to hook all their heterogeneous clients together at the server and get on with their applications development," Michnoff explained.

Bill Sheehan, director of information services at the Commonwealth of Massachusetts Metropolitan District Commission, verified Michnoff's assessment. "The main thing I want to do is integrate my Macintoshes into my Vines network," he said. "I'd also like connectivity to other platforms."

Last July, Banyan hired Compaq Computer Corp. veteran James D'Arezzo as marketing vice president. Since that time, the firm has increased its marketing budget by 50%, inducted a six-member marketing team and retreated from the network server business to focus attention on its major strength: LAN software with inherent wide-area communications capabilities.

In addition, the company is expanding its distribution channel. For example, the ink is barely dry on an agreement to extend Memorex Telex Corp.'s resale, service and support of Vines from the southern U.S. to the entire nation.

On the interoperability front, Banyan's February announcement of a partnership

with AT&T coincided with the availability of products that allow Vines networks to communicate with AT&T's LANs. The fact that the announcement reflected actual product availability recouped some credibility for Banyan, analysts said.

The industry is still stinging from the firm's May 1990 promise to deliver interoperability between Vines and Microsoft's LAN Manager. That project — labeled "nothing but pure smoke" by Infonetics Research Institute, Inc. Presi-

dent Michael Howard — is reportedly still under way, though its only fruits have been some OS/2 applications programming interfaces added to Vines 4.10.

D'Arezzo conceded that "it's time we did a better job of delivering on our promises. We need to put up or shut up."

Despite its historic marketing Achilles' heel, the firm increased worldwide sales from \$46 million in 1988 to \$98 million in 1990. According to International Data Corp., Banyan reported that fourth-quarter 1990 revenue of \$28 million was up 35% from the same quarter in '89.

Hyland asserted that the quarterly growth "looks good, but not great. Banyan is slowing down in terms of resource dollars" it can invest to keep its technological upper hand. She said the firm has refrained from going public because of continuous senior management turnover and a revenue growth slowdown resulting from its retreat from the hardware business.

## Shifting winds

**N**ovell strides toward adding wide-area networking capabilities to its traditionally work group-oriented Netware LAN could help the firm encroach on Banyan's global networking turf.

For example, Novell added T1 support to its server last year. Based on client feedback, Kevin O'Neill, network research and consulting vice president at Newton, Mass.-based Business Research Group, said the move kept Novell from losing many customers to enterprise-oriented Banyan.

In February, Novell "blew the industry away" when it introduced Netware v3.11, according to Forrester Research's Janet L. Hyland. The revamped network operating system includes support for several key communications protocols in addition to its proprietary IPX/SPX. It also brings Apple Macintosh network clients into the existing MS-DOS, Windows, OS/2 and Unix Netware client fold.

At the time of the v3.11 announcement, Novell also partnered with IBM in a worldwide reseller agreement that, by combined installation numbers alone, allows the two firms to rub elbows with a large chunk of would-be Vines users.

All these moves enhance Netware's attractiveness to firms with multivendor computing environments — the profile of firms moving toward enterprisewide networks.

JOANIE M. WEXLER

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# Software lawsuit prompts questions on patents

## ANALYSIS

BY JAMES DALY  
CW STAFF

Is the software patent the doormat of the computer industry? Paul Heckel thinks so. For the second time in as many years, the industry veteran and Hyperacks, Inc.

president is gearing up to defend a software patent he says has been repeatedly walked on since he obtained it in 1984. In the process, he could write an important new chapter in the battle for intellectual property rights.

Heckel claims to have invented the on-screen image of a stack of file cards and used it in a product called Zoomracks.

Several years later, Apple Computer, Inc. employed a similar motif in its much-heralded Hypercard. Heckel sued and won, forcing Apple to cut him a substantial check and draw up a technological cross-licensing swap.

Now Heckel is challenging both IBM and Asymetrix Corp. Asymetrix produces an application builder called Toolbook

that IBM bundles with some Personal System/2 models.

"So far, nobody has gotten hit real hard over misuse of software patents," said Heckel, a former consultant to Xerox Corp.'s legendary Palo Alto, Calif., Research Center. "Maybe when they do, patents will start getting treated with the respect they deserve."

Although Heckel has yet to formally file charges, and IBM and Asymetrix spokesmen refuted his claims, the standoff has reignited long-simmering debates about the need for software patents. Depending upon which side is speaking, software patents are either an essential protective armor for innovative programmers or a suffocating pillow over the face of the software industry.

### Patent vs. copyright

Unlike copyright laws, software patents protect an application's fundamental technology. A programmer who uses an entirely different code yet produces a functionally similar application could be in deep legal trouble.

A patent grants exclusive rights for making, using and selling the invention for 17 years. Once a patent exists, anyone who wants to further develop the software must obtain a license from the patent holder.

Critics such as the League For Programming Freedom based in Cambridge, Mass., said software patents are not only irksome but dangerous. They bundle the risk of a lawsuit into every design decision in the development of a program, League President Jack Larsen said.

League members said it is difficult and expensive to figure out whether each specific programming technique is patented. To avoid a lawsuit, developers would need to make each new product look completely different. Heckel questioned such arguments. "So little software has been patented and the scope of most patents [is so] relatively narrow that the chance of a programmer trampling over someone's patent is very slim," he said.

Recent years have seen a shift to stronger patent laws, said Richard Bernacchi, an attorney with the law firm of Irell & Manella. A major reason is the 1982 creation of the Court of Appeals for the Federal Circuit, which has upheld 70% of the patents that have been challenged before it, he explained. "The district and appellate courts were not able to understand technology, so there was a tendency to invalidate patents because they feared a monopoly," Bernacchi said.

Many observers placed the problem at the door of the Patent Office. "The Patent Office is not adequately armed with qualified technical examiners and a large enough database to determine who already owns a patent and who should be granted one," said Ken Wasch, president of the Software Publishers Association in Washington, D.C.

A typical patent search will also frequently overlook pending patent applications. Since it typically takes several years for a software patent to be granted, this presents a serious problem. A developer could design and release a large program after a patent has been applied for but only learn later that distribution of the program is prohibited.

Instead, Wasch argued, copyrights should be the vehicle for protecting intellectual property. While patents protect ideas, copyrights protect the expression of those ideas.

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## Reference checks: The truth be known

BY EMILY LEINFUSS  
SPECIAL TO CW

**T**wo former criminals apply for applications programming positions at Black & Decker Corp. in Towson, Md. The first, convicted of breaking and entering, was candid about it in the job interview. The other, also a onetime burglar, failed to mention his past. However, the firm's standard reference-checking procedures found him out. The honest man got the job.

This illustrates not only that honesty is the best policy but also that reference checking is a basic, integral part of the hiring process, information systems executives say.

"It is a hygienic factor. You must do it for every applicant to make sure there is nothing hidden," says Sid Diamond, Black & Decker's vice president of worldwide IS.

Checking references, however, comes with its own set of problems: It's a time-consuming task, and it can brush up against legal privacy issues.

Drawing the line between what a company needs to know about a prospective employee and what can be interpreted as an invasion of privacy can be difficult. That is why many companies will only give out "neutral" references, and some will not even discuss their personnel policies at all. A neutral reference check verifies dates of employment, positions and pay rates.

Employers are leery of lawsuits involving defamation of character and slander. Sometimes, a reference can have an ax to grind. "We are scared to death of that happening, so we just have the flat-out [neutral reference checking]," says Peter Palmer, K Mart Corp.'s vice president of labor relations and assistant general counsel.

Palmer admits that employers have an obligation not to hire somebody who could threaten public safety. "If an employee was harmed by a mass murderer

we had hired, and we hadn't done any kind of check, someone could allege negligent hiring," he says.

Most IS managers get around the time-draining task of validating references by delegating it to human resources departments, outside investigators or executive search firms.

For example, Ernst & Young asks applicants to sign a release form that allows the company to send the applica-

tion and resume to the investigative firm Research Associates, Inc. in Cleveland. Research Associates then runs a

thorough analysis of the person, says Scott Evans, manager of IS recruiting at Ernst & Young. The firm verifies all employment, references, education, litigation and credit

backgrounds. It also interviews references and informal sources within the applicant's former



places of employment.

Most often, these reference checks turn up inconsistencies in education and credit histories, says Dean Kuntz, an investigator at Research Associates. One applicant for a \$100,000-per-year IS position claimed to have a doctorate but had actually falsified the diploma. Many people who have filed for bankruptcy fail to mention it on their job applications, yet most companies want to know about a person's financial history, Kuntz says.

Recruiting firms also run detailed reference investigations for their clients. Preliminary checks are usually informal contacts with professionals in the industry who have worked with the applicant, says Alan Grossman, a senior partner at recruitment firm A. Davis Grant & Co. in Ise- lin, N.J. Formal investigations are 15- to 20-minute telephone conversations with stated and informal references. The firm asks questions that reveal why the applicant left the job, how creative he was and how he interacted with the user community.

An employer ultimately wants to know if applicants can perform the skills of the job and get along with their peers. "Mavericks don't usually do well in this business," Evans says.

For the most part, IS employers say, applicants tell the truth. But it is a one-sided truth. "I would say that sometimes applicants just don't tell the whole truth. There are gray areas they overlook, and we have to find them out," Diamond says.

Leinfuss is a free-lance writer based in Sarasota, Fla.

## Drawing the line

**E**very state has its own pre-employment question policy, which is determined by the department of fair employment or equal opportunity commission. The following are guidelines combined from several states to assist hiring managers in learning areas to watch out for:

- **Education.** You *can* ask about academic, vocational and professional experience.
- **Experience.** You *can* inquire about previous work experience.
- **Character.** You *can* ask for names of previous employers, co-workers and personal references to probe the character of the applicant.
- **Birthplace, citizenship.** You *cannot* ask applicant where he was born, whether he is nationalized or what date he acquired citizenship. You *can* ask applicant if he can submit verification of his legal right to work in the U.S.
- **Sex, marital status.** You *cannot* inquire about an applicant's sex or marital status.
- **Age.** You *can* ask if a person is under 21 or over 65.
- **Religion.** You *cannot* ask applicant his religious denomination or religious days observed.
- **Race and color.** You *cannot* ask an applicant's race or color.
- **Military experience.** You *cannot* ask the person whether he ever served in a foreign military. You *can* ask about relative skills acquired during applicant's U.S. military service.
- **Organizations.** You *cannot* inquire about organizations in which the applicant is a member. You *can* ask applicant to list job-related organizations to which he belongs, omitting those that indicate race, religious creed, color, sex and age.
- **Criminal record.** You *cannot* ask about arrests or convictions that occurred more than 10 years prior to the date of application unless the conviction involved a sexual or narcotics offense or imprisonment.

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A minimum of 5 years' experience with advanced technologies and system development processes, 1+ years' experience in IE full life-cycle development, and prior supervisory and project management experience are required.

## SENIOR RAD ADMINISTRATOR

You will lead a group of internal consultants on Rapid Application Development (RAD) approaches, including selection, methodology, and tools and techniques such as group analysis and design, prototyping, data modeling, incremental development, etc.

At least 8 years' application and data modeling/data administration experience is essential including exposure to prototyping, rapid application development approaches, productivity enhancement and measurements, and joint applications requirements and design sessions.

## SYSTEMS ADMINISTRATOR

You will lead a team in the analysis, design, development, testing and implementation of solutions for our Small Business Market group, including interpreting business requirements to determine the effectiveness of systems strategies and designs.

To qualify, you must possess at least 5 years' experience with proven abilities in systems development and business skills, and working knowledge of IEM, IEF, relational databases, PCs, and mainframe to PC connectivity.

## APPLICATIONS TECHNICAL ADVISOR

You will provide technical guidance to team members and support the development, maintenance and use of business systems to achieve objectives. Additionally, you will participate in prototyping, modeling and designing business system applications and databases.

6+ years' applications development experience, with a minimum of 3-4 years' experience in developing systems solutions to business opportunities, and knowledge of business systems engineering, IEF, IEM, knowledge-based technology, change management and project management are required.

## DATA ADMINISTRATIVE ANALYST

You will direct the development of corporate data definitions and manage related administration tasks; consult on logical modeling; advise on the use of data and its implications, and monitor the data plan.

At least 6 years' applications development experience is required, with a minimum of 3 years in systems development. Knowledge of data modeling, Data Dictionary (Data Manager, Repository) and IRM Orientation (RSDM, IEM) also is essential.

In addition to the above requirements, these positions require strong leadership, motivational and team-building skills, and effective communications abilities.

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Or send your resume, indicating the position of interest, to: Aetna Information Technology, Recruiting, C34A, Dept. 1748A, 151 Farmington Ave., Hartford, CT 06156. Aetna is an Equal Opportunity, Affirmative Action Employer.

**Look for information on Aetna's Career Forum coming to the New York Metropolitan Area in early May.**

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**APPLY:** Send resume to Chief Paula M. Guidry, FDLE, Bureau of Personnel Management, P.O. Box 1469, Tallahassee, Florida 32302. For further information contact Chief Guidry at the above address or call (904) 488-4814. A background investigation including drug screening is conducted prior to employment. FDLE is an Equal Opportunity/Affirmative Action Employer.

**APPLICATION DEADLINE:** MAY 6, 1991 at 5pm. Application must be received by 5pm of the deadline date; postmarks are unacceptable.



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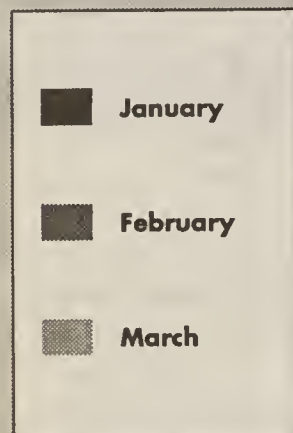
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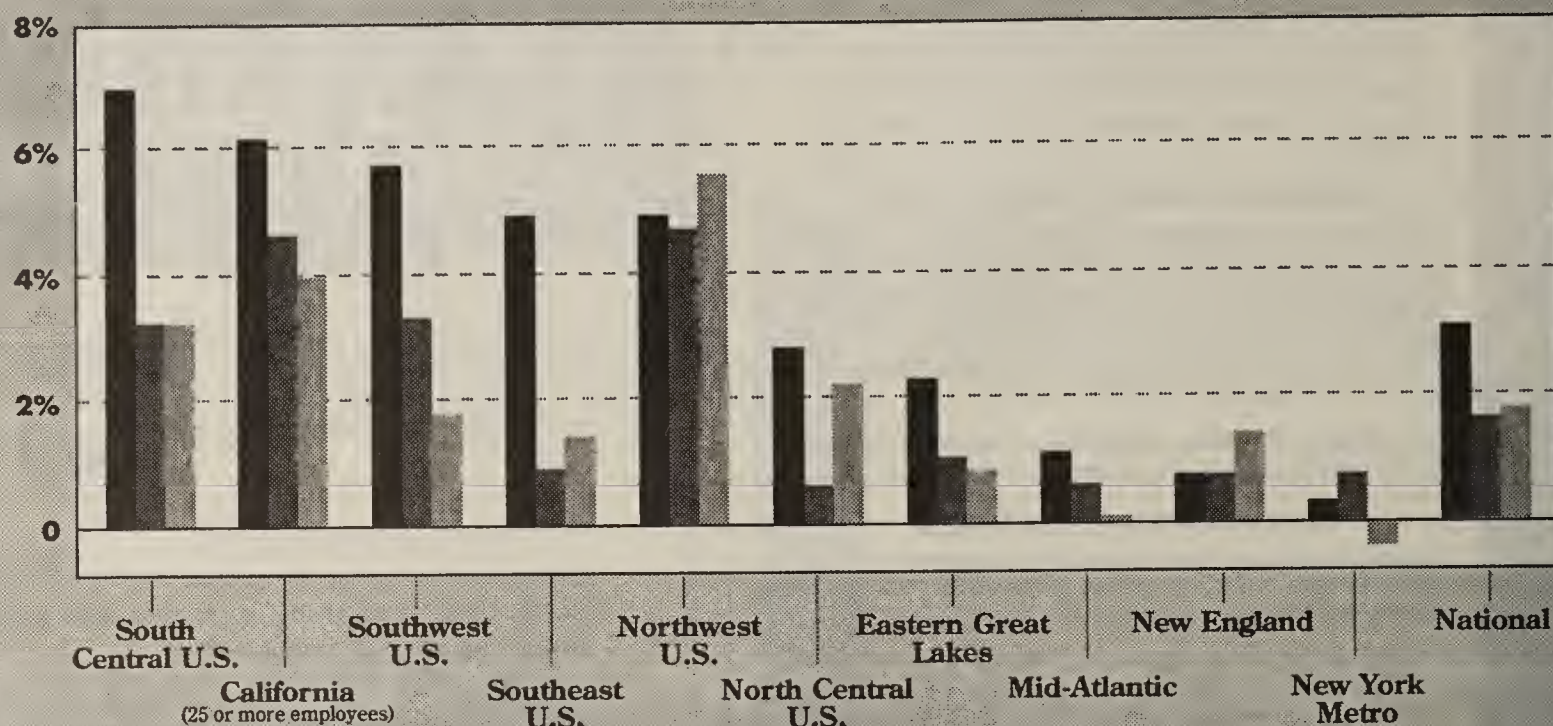
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Monthly employment growth by region in technology manufacturers with less than 1,000 employees

Percent change in number of employees by region



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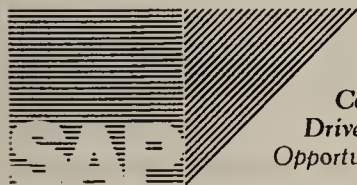
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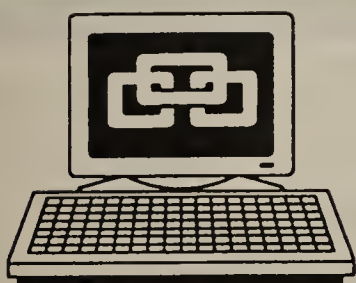
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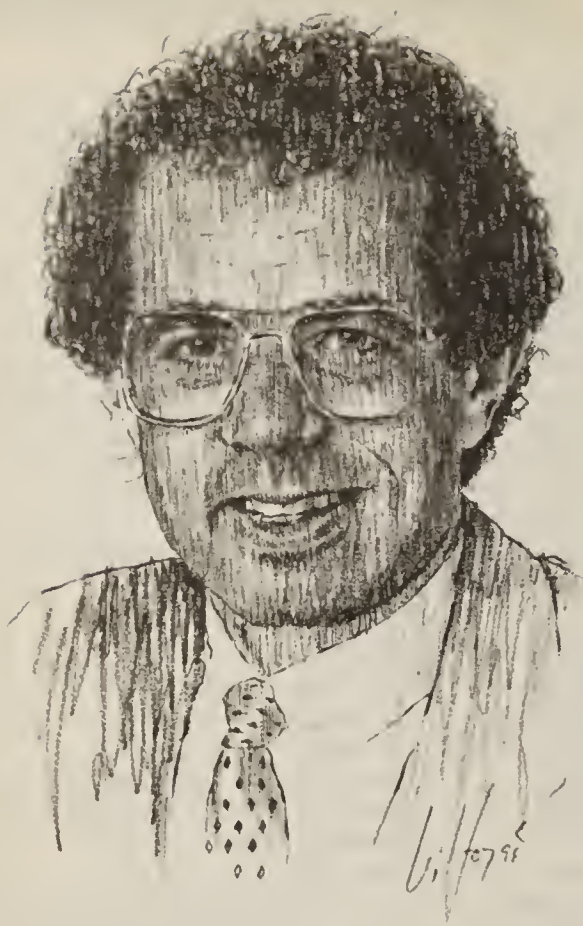
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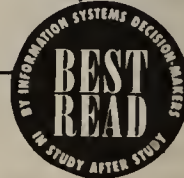
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THE NEWSWEEKLY OF INFORMATION SYSTEMS MANAGEMENT  
March 1990 Vol. 17/No. 22 160 Pages \$20.00 (US) \$25.00 (CAN)

### OS/2 stays Microsoft leads DOS revival

### MARKETPLACE

#### The new look of leasing systems

State laws will redefine 'sale' and 'lease' and change the terms of each

BY RAYMOND T. NIMMER  
Special to C.W.

Whether you are a computer buyer or a computer seller, you know that the terms of a lease or a sale can make a big difference in the bottom line. And now, as state laws redefine the terms of a lease and a sale, the difference could be even bigger.

In general, the difference between a lease and a sale is that in a lease, the lessor retains ownership of the equipment, while in a sale, the lessee becomes the owner. But as state laws change, the distinction is becoming blurred.

In many states, a lease is now defined as a transaction in which the lessor transfers the right to use the equipment for a fixed period of time, and the lessee pays a fixed amount for the use of the equipment. This definition is similar to the one used in the Uniform Commercial Code (UCC).

Under the UCC, a lease is defined as a transaction in which the lessor transfers the right to use the equipment for a fixed period of time, and the lessee pays a fixed amount for the use of the equipment. This definition is similar to the one used in the UCC.

As state laws change, the distinction between a lease and a sale is becoming blurred. In many states, a lease is now defined as a transaction in which the lessor transfers the right to use the equipment for a fixed period of time, and the lessee pays a fixed amount for the use of the equipment. This definition is similar to the one used in the UCC.

The lesson in a true lease is that the lessor retains ownership of the equipment, and the lessee pays a fixed amount for the use of the equipment. This is the traditional definition of a lease. But as state laws change, the distinction between a lease and a sale is becoming blurred. In many states, a lease is now defined as a transaction in which the lessor transfers the right to use the equipment for a fixed period of time, and the lessee pays a fixed amount for the use of the equipment. This definition is similar to the one used in the UCC.

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# MARKETPLACE

## Cheap surge protectors not always best answer

BY ALAN RADDING  
SPECIAL TO CW

If you spent \$8 to \$29 for a metal oxide varistor (MOV) surge protector and you think your personal computers and networks are protected, think again. Some information systems workers and users are now saying that these low-end offerings are just not good enough.

Surge protectors are designed to intercept sudden jumps of power in computers and to dissipate them harmlessly. Problems with power surges show up as inexplicably lost or damaged data, sudden crashes and seriously damaged hardware. PCs and workstations are particularly vulnerable to power surge damage because they draw relatively little power.

There are two major problems with common, inexpensive surge protectors. First, they are built using MOVs, which capture the sudden surge of power but wear out quickly and soon become use-

less. "We used to use MOV protectors, but they'd only last until the first lightning storm," says Chris Jackson, manager of Samuel Jackson Manufacturing Co. in Lubbock, Texas.

Second, the low-cost devices divert the surge to the ground wire, which can interrupt data flow and corrupt data in a network environment. Even with a stand-alone PC, diverting the surge to the ground can cause garble in documents from an attached modem or printer.

In a 1988 technical paper, Francois D. Martzloff at the National Bureau of Standards first identified the dangers inherent in MOV-based surge protectors, particularly when surges are diverted to the ground. "An unexpected side effect of these surges . . . was apparent damage suffered by the data line input components," he noted.

Power engineers also recognize the limitations of MOV-based surge protectors. "The problem with MOVs is that they fail open, and you don't know

they failed," says Kenneth Brill, president of Computersite Engineering in Danvers, Mass. When the MOV fails, it lets the surge pass through unchecked and unknown to the user until it causes damage.

Now there are alternatives to MOV-based devices. Zero Surge, Inc. in Princeton, N.J., and Sutton Designs, Inc. in Ithaca, N.Y., offer devices that cost from \$150 to \$190. The alternatives don't rely on MOVs exclusively; instead, they provide additional filters and circuitry associated with MOV-based products. Isolation transformers can also do the job, but they are large, heavy and very expensive.

However, just because these products are available doesn't mean much. IS workers and users say they are having a tough time appealing to their managers to spend three to five times more on the new offerings than they would on a MOV-based surge protector.

"It's hard to convince somebody to spend \$150 when they can spend as little as \$8 for something they think does the same thing," says Bill Shuff, a materials engineer at General Electric Co. in Schenectady, N.Y.

Few organizations have a formal surge protection policy for end-user PCs and workstations. "We don't require one except where it is mission-critical. It depends on the user's preference,"

says Stephen Rood, manager of microcomputer technology at New York-based Coopers & Lybrand.

In the hope of sparking more IS response, individual users and IS workers have started a grassroots campaign around the issue of surge protection, carried on

the Geoserve Division of Manufacturers Hanover Corp. He finally installed the Zero Surge device and the problems stopped. Now it is the only protector his department uses.

"Nobody complained about the cost. We spend \$3,000 to \$5,000 for a workstation, so an-

**"IT'S HARD TO CONVINCE somebody to spend \$150 when they can spend . . . \$8 for something they think does the same thing."**

BILL SHUFF  
GENERAL ELECTRIC



through user groups and electronic bulletin boards. The campaign has yet to make much headway in large corporations.

For instance, Shuff learned about the Zero Surge device through an Apple Computer, Inc. user group. He tried the product on computer equipment that had suffered from mysterious damage, and the problem was fixed. However, his company won't formally adopt Zero Surge on all of its systems.

Corporate users usually turn to the more costly surge protectors only as a last resort. "We were having a series of Netbios errors on one local-area network. It's difficult to prove, but we suspected the problem was surges," says Marty Stanton, IS officer at

other \$150 for a surge protector seems reasonable," Stanton says.

Weber Marking Systems, Inc. in Arlington Heights, Ill., incorporated the Sutton Designs surge protector into its label printing systems because the device represented a compromise between the low-cost devices and more costly systems.

Compared with five low-cost MOV devices Weber Marking Systems reviewed, the Sutton product "did the job without getting into really large money," says Gerald Permann, Weber's senior IS buyer. "Many of the cheap ones did nothing," he adds.

Radding is a free-lance writer in Newton, Mass.

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
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**Product Spotlight: Local Area  
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**Marketplace Section:**

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**Executive Report: Data Center  
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AT Model 099	\$650	\$775	\$500
AT Model 239	\$725	\$925	\$700
AT Model 339	\$875	\$1,000	\$800
PS/2 Model 30-286	\$1,100	\$1,300	\$1,000
PS/2 Model 60	\$1,300	\$1,700	\$1,300
PS/2 Model 70P	\$3,200	\$3,500	\$3,000
Compaq Portable II	\$900	\$1,050	\$875
Portable 286	\$1,100	\$1,350	\$1,000
SLT 286	\$2,250	\$2,500	\$2,000
Portable 386	\$2,300	\$2,500	\$2,200
LTE 286	\$2,200	\$2,500	\$1,900
Deskpro 286	\$800	\$1,000	\$700
Deskpro 386/20	\$2,150	\$3,000	\$2,000
Apple Macintosh Plus	\$750	\$975	\$700
SE	\$1,125	\$1,250	\$1,100
II	\$2,600	\$2,800	\$2,400
IICX	\$3,300	\$3,600	\$3,200
IIFX	\$5,900	\$6,500	\$5,900

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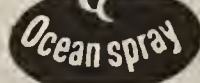
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Government .....	62,291
Utilities, Communications Systems, Transportation Services .....	58,516
Mining, Construction, Petroleum & Refining .....	17,618
Manufacturers of Computers & Peripherals .....	63,550
Systems Integrators, VARs, Computer Service Bureaus and Consulting .....	100,673
Computer Dealer, Distributor, or Retailer .....	16,989
Other .....	28,313
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\*Source: Projected Total Audience Research Study Conducted Among Paid Subscribers of Computerworld, IDG Research Services, August 1990.

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# EDUCATION & TRAINING

## Future looks a little brighter for CBT

BY MARK FRITZ  
SPECIAL TO CW

Computer-based training (CBT), the self-instructional underdog that has never been able to outrun the traditional instructor-led pack, is starting to catch up — just a little bit.

Ironically, although CBT has been rejected because of its traditionally high start-up costs, the current economic downturn is providing a catalyst for its use by corporate information systems trainers. "CBT use is active, if not growing," says William Bramer, managing partner of change management research and development at Andersen Consulting.

Part of the reason is that when staff is cut, those left assume additional duties, which requires more training with fewer trainers, says Marc Silver, manager of self-instruction development at Unisys Corp.

CBT is also making a bigger dent in the training industry be-

cause more companies are recognizing that it helps trainers become more productive. For example, trainers can manage the training function by tracking student answers and scores, modules completed and so on. Often referred to as computer-managed instruction, this capability has long been a common advantage of mainframe-based CBT.

Now that personal computer networks have become more prevalent — often using a mainframe as a central file server — more trainers are discovering the advantages of mainframe management.

Also stirring the CBT pot is users' demand for faster training: Bramer says classroom training is too slow and unresponsive to change. "You could plan a workshop for three weeks from now, but by the time it rolls around, your information is dated," he says. The best way to keep up with changing information is to deliver instruction by machine, he adds.

In addition, CBT is a natural for embedded or concurrent training, says Eric Parks, president of Ask International, a custom-design training firm in Long Beach, Calif. "It's easy for people to see that the best way to teach software is with software," he says.

However, CBT has some negative images and problems that continue to stand in its way.

In the past, CBT was misunderstood, Parks says. It was seen as a "solve-all," which, he says, led to the misapplication of this powerful technology. Misapplication, in turn, resulted in black-sheep CBT programs that have given the whole field a bad name.

Using CBT with beginners has been one of the most flagrant misapplications. For example, an attempt to use CBT to teach Lotus Development Corp.'s 1-2-3 spreadsheet to beginners was a disaster, says Tori Coward, president of Tangent Computer Resources. When her company sent CBT disks to the students, many sent them back, saying 1-2-3 was too hard to learn.

"We later found out that these people hadn't even tried to use [1-2-3]; they hadn't gotten past

the CBT lesson," she says.

The confusion surrounding development tools for CBT has also stunted the technology's growth. Trainers often find that an authoring system is either too complex to learn or too simple to do the job properly. Add to that

early rise to stardom was the failure of interactive videodisc — a subset of CBT. Interactive videodisc still faces an uphill battle for acceptance, even though it was introduced 10 years ago.

Initially, interactive videodisc was to be the savior of CBT, combining the interactivity of CBT with the visual power of video to create a sort of super-CBT. Unfortunately, it was also over-

**N**OW THAT PERSONAL COMPUTER networks have become more prevalent — often using a mainframe as a central file server — more trainers are discovering the advantages of mainframe management functions.

the confusing assortment of products and the general lack of standards, and you start to understand why many training organizations have stuck to stand-up training techniques.

In addition, authoring tools are costly. Not only is the initial cost of most software high, but many vendors also tack on runtime licensing fees for any applications produced with these tools. Parks says the fees have inhibited the spread of CBT.

Further preventing CBT's

hyped and misapplied.

Trainers and users are not counting CBT out; instead, they're predicting a bright future for the beleaguered technology.

"Training is seen as a perk by most people. It gives them a chance to get away from their desks, go off-site, see their colleagues, get free coffee and doughnuts. They don't get those things with CBT," Parks says.

Fritz is a free-lance writer based in Dedham, Mass.



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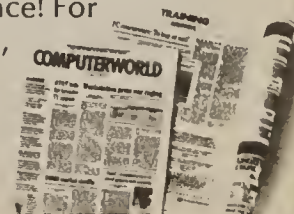
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# INDUSTRY ALMANAC

## ACE AND THE INVESTOR

Judging by stock movement among its members, the Advanced Computing Environment (ACE) consortium unveiled two weeks ago has piqued investor interest. From industry analysts, though, ACE has drawn but a skeptical nod.

During the week following the April 9 announcement, **Digital Equipment Corp.** and **Microsoft Corp.** — ACE's two largest members — each surged two points, closing Tuesday at 65 and 112¼, respectively. Several other members also advanced, including **Silicon Graphics, Inc.**, which picked up 1½ points to 38¾.

However, now may not be the time to buy stock in ACE members if the decision is based purely on anticipated ACE accomplishments, brokerage analysts said. Mark Stahlman and Steve Eskenazi, analysts at Alex. Brown & Sons, Inc., said they do not expect ACE to dent the desktop computing market until late 1992 or 1993. Even then, the installed base and shipment rates of workstations from **Sun Microsystems, Inc.**, **Hewlett-Packard Co.** and **IBM** "may present too large a barrier" for ACE to penetrate, they added.

For short-term investing, Stahlman and Eskenazi recommended Silicon Graphics, despite its third-quarter profit drop of 64% posted Thursday. They predicted the firm's expected introduction of an under-\$10,000 workstation this fall to stir sales.

Sentiment varies for ACE leader **Compaq Computer Corp.** Alex. Brown rates it a gung-ho "buy," while UBS Securities, Inc. suggested holding Compaq stock, at least for now, because of uncertain near-term demand for personal computers. UBS analyst Marc Schulman said he is confident in Compaq's future, in part because of its involvement with ACE. He called Compaq "attractive on an intermediate-to-long-term basis."

Even though ACE members have agreed to build processors from **Mips Computer Systems, Inc.** into their hardware, Mips is now rated a "source of funds" by Stahlman and Eskenazi, who noted the company's current high stock valuation. Mips' long-term prospects look better, they said, because the consortium gives Mips "a shot at considerable business that otherwise would have defaulted to other contenders."

Meanwhile, Schulman said, DEC now hovers on the rim of what could be a profitable new market for it: desktop computers. Yet, he remained neutral on DEC shares in the short term because DEC has been hurt this year by battered demand for its VAX 9000.

Schulman added that new workstations from HP may bite into DEC's business. "It's 1992, not 1991, for DEC's renaissance," he said.

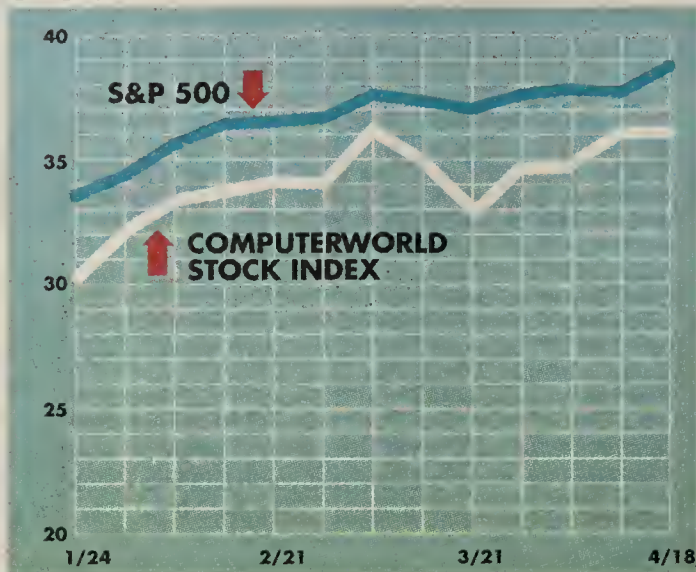
HP, which is not a member of the consortium, is rated a "buy," by Schulman. While ACE may become a problem for HP two years from now — when Schulman predicted the group will likely come into its own in the workstation market — "this year, HP's new machines will be more important than its exclusion from ACE," he said.

Sun, decidedly not an ACE partner, looks like a good buy to several Wall Street watchers. Richard Shaffer, editor of "Computer Letter," an industry newsletter, said Sun has a large lead in the workstation arena, a start so big that it may preclude ACE from being more than a "last-place entrant in the traditional workstation market."

Instead, the coalition should concentrate on high-performance distributed systems, according to Shaffer.

KIM S. NASH

## STOCK TRADING INDEX



# Computerworld Stock Trading Summary

CLOSING PRICES FRIDAY, APRIL 19, 1991

### TOP PERCENT GAINERS

Tandon Corp.	30.89
Recognition Equipment	21.28
LSI Logic Corp.	20.51
System Software Assoc.	18.31
Western Digital Corp.	17.95

### TOP PERCENT LOSERS

Seagate Technology	-29.75
Boole & Babbage Inc.	-22.81
Dell Computer Corp.	-18.57
Apple Computer Inc.	-16.90
AST Research Inc.	-14.73

### TOP DOLLAR GAINERS

Digital Equipment Corp.	6.50
Autodesk Inc.	4.13
Storage Technology	3.75
System Software Assoc.	3.25
United Telecom	2.75

### TOP DOLLAR LOSERS

Apple Computer Inc.	-12.13
Aldus Corp.	-6.63
Seagate Technology	-5.88
Dell Computer Corp.	-5.50
Symantec Corp.	-5.25

Exch	52-Week	Range	April 19	Wk Net	Wk Pct
			Close	Change	Change

Communications and Network Services Up 0.19%					
OTC	19.00	5.38	3 COM Corp.	9.00	0.00 0.00
NYS	69.75	52.50	American Info Techs Corp.	65.00	-0.13 -0.19
NYS	44.13	29.00	AT&T	37.25	2.00 5.67
OTC	6.75	0.88	Artel Communication Corp.	2.13	-0.13 -5.66
NYS	56.25	39.50	Bell Atlantic Corp.	48.63	-2.25 -4.42
NYS	57.63	49.00	Bellsouth Corp.	51.63	-0.75 -1.43
NYS	41.63	13.13	Cabletron Systems	41.63	2.63 6.73
OTC	25.88	8.25	Compression Labs Inc.	19.88	-1.88 -8.62
NYS	41.25	23.38	Contel Corp.	41.00	0.00 0.00
OTC	5.13	1.88	Data Switch Corp.	3.88	-0.25 -6.06
NYS	26.75	8.88	Digital Comm. Assoc.	20.63	0.63 3.13
OTC	25.25	12.25	Dynatech Corp.	21.00	-0.13 -0.59
OTC	12.88	5.50	Fibronix Int'l Inc.	9.25	-0.13 -1.33
OTC	4.00	1.75	Gandalf Technologies Inc.	3.38	-0.25 -6.90
NYS	4.50	1.63	General Datacomm Inds.	3.50	0.50 16.67
NYS	34.13	23.50	GTE Corp.	31.75	-0.50 -1.55
OTC	6.25	0.75	Infotron Systems Corp.	1.50	0.00 0.00
NYS	60.88	40.25	ITT Corp.	58.88	1.63 2.84
OTC	44.13	17.88	MCI Communications Corp.	28.63	1.00 3.62
OTC	21.00	2.75	Microcom Inc.	5.50	-0.25 -4.35
NYS	16.38	4.00	Network Equipment Tech.	7.50	0.00 0.00
OTC	14.63	4.00	Network General	8.88	0.63 7.58
OTC	15.50	8.13	Network Systems Corp.	11.13	-1.38 -11.00
NYS	33.13	22.13	Northern Telecom Ltd.	32.88	0.25 0.77
OTC	58.50	17.25	Novell Inc.	53.00	-2.88 -5.15
NYS	89.50	67.00	Nynex Corp.	72.50	-0.50 -0.68
NYS	47.88	36.25	Pacific Telesis Group	41.25	-0.50 -1.20
ASE	15.38	4.75	Penril Corp.	14.50	0.00 0.00
NYS	29.13	8.88	Scientific Atlanta Inc.	16.75	1.00 6.35
NYS	58.88	47.25	Southwestern Bell Corp.	54.00	1.00 1.89
NYS	46.38	20.63	United Telecom	26.00	2.75 11.83
NYS	40.75	32.38	US West Inc.	38.25	-0.88 -2.24

### Computer Systems Off 0.65%

OTC	8.75	0.56	Alliant Computer Sys.	1.38	-0.13 -8.33
ASE	18.88	10.00	Amdahl Corp.	16.50	-0.38 -2.22
OTC	73.25	24.25	Apple Computer Inc.	59.63	-12.13 -16.90
OTC	13.88	4.25	Archive Corp.	8.63	0.25 2.99
OTC	32.75	7.50	AST Research Inc.	27.50	-4.75 -14.73
NYS	7.38	3.88	Bolt, Beranek & Newman	6.88	-0.13 -1.79
NYS	21.63	4.50	Commodore Int'l	18.50	-1.13 -5.73
NYS	74.25	35.50	Compaq Computer Corp.	60.63	-2.63 -4.15
OTC	2.13	0.13	Computer Automation Inc.	1.13	0.13 12.50
NYS	21.13	6.75	Control Data Corp.	13.00	0.63 5.05
NYS	20.88	8.38	Convex Computer	19.13	2.38 14.18
NYS	51.25	20.00	Cray Research Inc.	38.50	0.88 2.33
NYS	15.50	3.50	Data General Corp.	15.50	0.13 0.81
NYS	3.25	0.75	Dell Computer Corp.	1.75	-0.25 -12.50
OTC	30.63	8.25	Digital Equipment Corp.	24.13	-5.50 -18.57
NYS	95.13	45.50	Digital Equipment Corp.	71.63	6.50 9.98
NYS	36.13	13.75	Harris Corp.	26.50	0.75 2.91
NYS	53.00	24.88	Hewlett-Packard Co.	53.00	1.38 2.66
NYS	139.75	96.25	IBM	109.50	1.13 1.04
OTC	14.00	7.75	Information Int'l	8.13	0.13 1.56
OTC	29.75	10.50	Intergraph	28.75	-0.75 -2.54
NYS	3.00	0.50	MAI Systems Corp.	0.75	0.00 0.00
NYS	149.75	114.00	Matsushita Electronics	126.25	-2.50 -1.94
OTC	26.00	9.00	Mentor Graphics Corp.	17.00	-0.38 -2.16
NYS	100.50	44.50	NCR Corp.	96.75	-0.25 -0.26
OTC	35.50	11.00	Pyramid Technology	26.75	-0.50 -1.83
OTC	34.00	9.75	Sequent Computer Sys.	18.50	2.00 12.12
NYS	47.25	18.00	Silicon Graphics	39.38	0.50 1.29
NYS	36.50	14.63	Stratus Computer Inc.	36.50	0.63 1.74
OTC	37.25	15.00	Sun Microsystems Inc.	34.13	-1.00 -2.85
NYS	28.88	8.88	Tandem Computers Inc.	15.63	1.13 7.76
NYS	39.50	23.50	Tandy Corp.	35.38	0.63 1.80
OTC	32.00	6.75	Teradata	20.13	1.13 5.92
NYS	7.88	1.38	Ultimate Corp.	4.75	-0.13 -2.56
NYS	15.88	1.75	Unisys Corp.	4.88	-0.25 -4.88
ASE	5.75	2.00	Wang Labs Inc. (b)	3.75	-0.25 -6.25

### Software & DP Services Off 0.09%

OTC	60.25	17.00	Adobe Systems Inc.	57.00	-5.00 -8.06
OTC	59.88	16.75	Aldus Corp.	50.13	-6.63 -11.67
OTC	26.75	12.00	American Mgmt. Systems	26.00	-0.50 -1.89
OTC	18.25	7.50	American Software Inc.	11.25	0.25 2.27
NYS	4.63	1.38	Anacom Inc.	3.63	-0.25 -6.45
OTC	23.50	10.00	Analysts Int'l	15.75	0.50 3.28
OTC	13.25	4.88	Ashton Tate	9.75	-0.25 -2.50

## THIS WEEK'S HIGHLIGHTS

• Disappointed with Apple Computer, Inc.'s second-quarter profits, investors knocked Apple shares back 10 points last week to close Thursday at 61. Other micro-computer makers also stumbled. Compaq Computer Corp. lost 3¼ points to 61¼, and Dell Computer Corp. slid 4½ points to 25¼.

• After posting better-than-anticipated earnings, Digital Equipment Corp. advanced 5½ points to 70¾. IBM continued to lose after making official its weak first-quarter financials, dropping ⅞ of a point for the week to 109¾.

• Among software makers, Lotus Development Corp.'s reported 71% profit dip for the quarter did not stop its stock from jumping 1¼ points to 29½. Microsoft Corp. closed Thursday at 110, down one point.

• Seagate Technology, Inc. reported lower-than-expected profits; its stock then fell far and fast, tumbling 5½ points to 13¾. Storage Technology Corp. added 2¾ points to 40¼ as it reported steady earnings gains.

Exch	52-Week	Range	April 19	Wk Net	Wk Pct
			Close	Change	Change
OTC	10.25	4.00	ASK Computer Sys.	8.63	1.13 15.00
NYS	70.00	45.25	Auto Data Processing	70.00	1.75 2.56
OTC	60.25	32.00	Autodesk Inc.	56.00	4.13 7.95
OTC	31.50	13.50	BGS Systems Inc.	28.50	1.25 4.59
OTC	43.88	17.75	BMC Software Inc.	40.75	1.00 2.52
OTC	21.50	11.00	Boole & Babbage Inc.	11.00	-3.25 -22.81
OTC	62.25	14.00	Borland Int'l	58.50	-3.00 -4.88
NYS	9.75	0.88	Businessland Inc.	1.88	-0.13 -6.25
OTC	19.63	5.13	Cognos Inc.	19.50	0.50 2.63
NYS	16.88	4.38	Computer Associates	8.88	-0.38 -4.05
OTC	17.75	10.75	Computer Horizons	13.25	-1.00 -7.02
NYS	71.50	36.75	Computer Sciences	70.63	0.13 0.18
NYS	11.75	6.63	Computer Task Group	10.38	-0.13 -1.19
OTC	25.25	13.00	Comshare Inc.	18.88	-0.13 -0.66
OTC	16.00	3.75	Corporate Software	12.38	1.38 12.50
NYS	47.88	27.88	General Motors E (EDS)	46.25	0.25 0.54
OTC	18.75	7.25	Goal Systems Int'l	15.75	1.25 8.62
OTC	5.75	1.88	Hogan Systems Inc.	4.63	-0.50 -9.76
OTC	19.75	7.75	Information Resources	18.50	-0.38 -1.99
OTC	17.50	2.63	Informix Corp.	7.00	-0.50 -6.67
OTC	7.88	1.38	IntellCorp Inc.	2.13	-0.13 -5.56
OTC	8.00	2.50	Interleaf Inc.	7.50	0.25 3.45
OTC	41.75	10.00	Knowledgeware Inc.	40.00	0.25 0.63
OTC	45.00	16.75	Legend Corp.	36.00	-0.13 -0.35
OTC	39.25	12.50	Lotus Development	28.88	0.88 3.13
OTC	32.00	13.63	Micrografix	19.75	-1.75 -8.14
OTC	116.75	50.75	Microsoft Corp.	107.25	0.00 0.00
NYS	10.50	4.00	On Line Software Int'l	9.63	0.63 6.94
OTC	24.00	4.88	Oracle Systems	10.38	-0.63 -5.68
NYS	14.63	7.00	Pansophic Systems	12.13	0.00 0.00
OTC	9.25	1.25	Phoenix Technologies	8.63	0.00 0.00
NYS	52.00	31.63	Policy Management Sys.	47.63	-1.38 -2.81
NYS	23.63	11.50	Reynolds & Reynolds	21.38	0.75 3.64
OTC	16.13	6.88	Sage Software Inc.	10.50	1.00 10.53
OTC	25.50	14.75	SEI Corp.	24.00	0.00 0.00
OTC	21.00	12.25	Shared Medical Systems	21.00	1.63 8.39
OTC	35.25	12.00	Software Publishing Corp.	19.75	-1.25 -5.95
NYS	14.50	5.50	Sterling Software	14.13	0.25 1.80
OTC	26.00	9.50	Sungard Data Sys.	16.75	1.00 6.35
OTC	55.88	17.75	Symantec Corp.	45.50	-5.25 -10.34
NYS	24.50	4.50	System Center Inc.	7.75	0.38 5.08
OTC	37.25	12.75	System Software Assoc.	21.00	3.25 18.31
OTC	27.38	4.75	Weitek	15.50	-0.13 -0.80

### Semiconductors Up 2.43%

NYS	13.88	3.63	Advanced Micro Devices	13.88	0.25 1.83
NYS	11.88	5.50	Analog Devices Inc.	11.75	0.63 5.62
OTC	21.75	5.25	Chips & Technologies	10.25	-0.25 -2.38
OTC	54.38	28.00	Intel Corp.	52.88	-1.38 -2.53
NYS	13.00	5.13	LSI Logic Corp.	11.75	2.00 20.51
NYS	18.25	6.75	Micron Technology	17.75	-0.25 -1.39
OTC	23.25	7.25	MIPS Computer Systems	18.50	-1.63 -8.07
NYS	88.38	45.75	Motorola Inc.	65.00	1.75 2.77
NYS	8.63	3.00	National Semiconductor	7.88	-0.13 -1.56
NYS	46.00	22.50	Texas Instruments	42.63	-3.25 -7.08
OTC	12.25	3.00	VLSI Technology	11.25	0.38 3.45
ASE	14.88	4.00	Western Digital Corp.	5.75	0.88 17.95

### Peripherals & Subsystems Up 0.63%

OTC	2.63	0.88	Apertus Technologies	2.50	-0.06	-2.46
OTC	24.00	7.50	BancTec Inc.	13.00	1.25	10.64
OTC	17.50	4.25	Cambex Corp.	15.00	-0.25	-1.64
ASE	11.75	4.13	Cognitronics Corp.	10.25	-1.25	-10.87
NYS	31.25	14.63	Conner Peripherals	27.25	1.00	3.81
ASE	22.00	7.00	Dataram Corp.	10.63	-0.13	-1.16
NYS	12.25	4.25	EMC Corp.	11.63	-0.25	-2.11
NYS	47.25	33.75	Eastman Kodak Co.	43.38	1.88	4.52
OTC	11.25	4.75	Emulex Corp.	9.50	-1.13	-10.59
OTC	34.50	14.00	Evans & Sutherland	21.00	1.00	5.00
OTC	6.50	3.75	Imega Corp.	5.63	-0.06	-1.11
OTC	28.25	6.75	IPL Systems Inc.	23.50	0.25	1.08
OTC	1.63	0.13	Masstor Systems	1.00	-0.03	-3.01
OTC	17.00	2.63	Maxtor Corp.	5.13	-0.38	-6.82
OTC	18.00	4.38	Micropolis Corp.	15.50	-2.25	-12.68
NYS	93.75	73.63	3M Corp	87.75	-0.75	-0.85
OTC	14.50	6.00	Printnrix Inc.	9.25	-0.25	-2.63
NYS	24.25	8.50	QMS Inc.	24.25	0.63	2.65
OTC	27.25	12.38	Quantum Corp.	25.75	-0.13	-0.48
NYS	7.13	4.38	Recognition Equipment	7.13	1.25	21.28
OTC	10.88	4.00	Rexon Inc.	10.88	1.00	10.13
OTC	19.88	5.63	Seagate Technology	13.88	-5.88	-29.75
NYS	41.38	11.00	Storage Technology	41.38	3.75	9.97
OTC	4.50	1.25	Tandon Corp.	4.50	1.06	30.89
NYS	25.88	11.63	Tektronix Inc.	25.88	0.25	0.98
OTC	0.63	0.16	Televideo Systems	0.38	0.00	0.00
NYS	59.63	29.00	Xerox Corp.	59.63	1.63	2.80



## Banks

FROM PAGE 1

banks are guarding their territories by planning innovations such as credit/debit cards. Offerings such as these demand that IS be inextricably linked to business strategy.

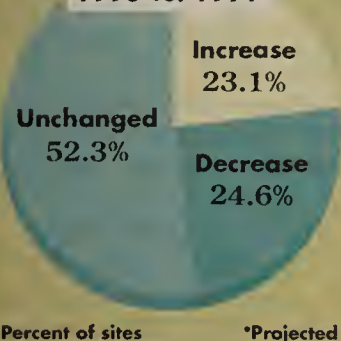
"It puts a large burden on the technology to bring together deposit and credit information,"

### Hold that line

More than 75% of firms in the finance/insurance/real estate sector are keeping 1991 capital expenditures at or below 1990 levels

#### Capital expenditures (Finance, insurance and real estate sector)

1990 vs. 1991\*



Source: The Dun & Bradstreet Corp.  
CW Chart: Doreen St. John

said Robert Spicer, chief information officer at Chevy Chase Federal Savings in Chevy Chase, Md. "The platforms for deposit and credit have been independently developed, but now they'll have to be networked."

New competition "just exacerbates the problems in an industry that already has too much capacity," said Brian Phillips, executive vice president of technical services at Norwest Corp. in Minneapolis. "Isn't it interesting how many people want to get into this business, despite all the current financial problems? It's viewed as a very lucrative long-term business."

Norwest hopes to fight back with IS-improved customer service. It is currently piloting a personal computer-based system that will allow branch employees to compare multiple bank products simultaneously on the desktop. "We're moving from branch automation to sales assistance," Phillips said.

### Another look

More than ever, bank executives said they want to see an IS dollar returned in market share, new customers or new fee-based services.

"We have had to re-evaluate the cost/value relationship of IS," said Michael Packer, vice president of technology strategic planning at Bankers Trust Corp. in New York. "We're still spending heavily in areas where we feel we can make money."

Many banks are now moving to correct the excesses of the 1980s, when deregulation and the global economic boom sparked a giddy expansion mentality that resulted in a hodgepodge of incompatible systems at many banks. Bank of Boston, for example, had no fewer than 11 hardware platforms and 55 databases, which it is now trying to streamline in a five-year IS architecture plan [CW, Dec. 10, 1990].

Like Bank of Boston, The Chase Manhattan Bank NA in New York suffered a huge loss (\$334 million) last year. Chase's actions are typical of the way in which many large banks have reacted to the current adversity; it is not slashing IS but, rather, spending selectively.

"Like all other areas of the bank, we need to save money and get things done sooner," said Elaine Bond, executive vice president of corporate systems. "Sometimes this means adding systems; sometimes it means taking them away." Chase has cut back its European operations, for example, while spend-

"ISN'T IT INTERESTING how many people want to get into this business, despite all the current financial problems? It's viewed as a very lucrative long-term business."

BRIAN PHILLIPS  
NORWEST

ing more on new applications in its credit-card business.

As the loan side of the banking business has soured, banks are looking to squeeze profits out of other areas — and they are looking to IS to help identify those areas. Systems that can do so are being spared the budget ax.

### Substantial savings

PNC Financial Corp. in Pittsburgh, the nation's 14th largest bank, said it has such an application: Internal Management Profitability Reporting (IMPR). Co-developed with Hogan Systems, Inc. at a \$5.5 million cost to PNC

ects in other areas, but it is hiring 30 people to use and update IMPR. "It was never in jeopardy," said William J. Johns, comptroller at the firm.

While spending continues in strategic areas, finding fat to cut is far from easy. Many systems, even if outmoded and expensive to maintain, have become so essential to the business that they are sacred. Banks can hold firm on capital expenditures (see chart at left), but many are finding that data center consolidations and outsourcing are the only ways to save significant amounts of money.

"Most of the people are maintaining code, operating the

### Technological distinctions

The largest financial institutions have vastly different technology priorities than those of the second tier

- Buy more PCs
- Review IS costs to reduce
- Re-examine PC policies and procedures
- Improve audit and security
- Buy more software

Source: Computer-Based Solutions, Inc.

#### Financial institution by asset size

(ranked in order of  
frequency of responses)

	\$501M to \$2B	Over \$2B
1	1	1
6	2	2
9	3	3
19	4	4
13	5	5

CW Chart: Doreen St. John

Financial, IMPR allows executives to analyze profitability by products, even very small ones. PNC Financial recently sold its Louisville, Ky.-based lockbox operations after IMPR helped show financial analysts that it was costing as much as it was bringing in.

PNC Financial lost \$168 million in the fourth quarter and is scaling back or deferring proj-

data center or monitoring telecommunications," said Diogo Teixeira, a partner at Ernst & Young's Information Technology Center in Boston. "It's very hard to find sizable cutbacks in IS."

### Feeling the pinch

One area feeling the pinch is the hired guns of programming and consulting. Republic National Bank in New York has cut its use of outside consultants by an estimated 80% to 85% in the past two years but has not laid off any full-time employees.

"If you're adequately staffed and don't have twice as many people as you need, there's not a lot you can do," said Ray Tama-yo, senior vice president. "Very little is discretionary."

With some exceptions, the leading banks realize that IS has long since passed the point of being a back-office, overhead function ripe for major cuts in tough times. Spending on technology for technology's sake is a luxury most banks can ill afford, but funding for strategic areas remains available — and necessary.

"I get frustrated with the notion that systems is in a class by itself," Bond said. "We're talking about the guts of the bank here. I wouldn't look for any dramatic changes."

## Money Savers

Two actions that can save big IS dollars in the recession-plagued banking industry are consolidating data centers and outsourcing.

Manufacturers Hanover Trust Co. in New York, for example, is in the process of whittling a set of eight data centers down to two. The bank has invested in two IBM Enterprise System/9000s in hopes of eventually saving \$20 million to \$30 million per year on operations.

Bankamerica Corp. recently closed its Hong Kong data center and combined overseas operations in London. It is currently considering further consolidations among five U.S. centers.

Other notable consolidators include First Interstate Bancorp in Los Angeles, which is combining five data centers into two, and Fleet/Norstar Financial Group, Inc. in Providence, R.I.

The outsourcing option has proven particularly appealing to banks experiencing financial

difficulty. Not every bank that chooses to outsource IS is operating in the red, but many are. Of the nation's top 100 banks, seven that lost money in 1990 have farmed out IS operations:

- Southeast Banking Corp. in Miami lost \$199 million; has outsourced to IBM.
- First City Bancorp. of Texas in Houston lost \$158 million; has outsourced to Electronic Data Systems Corp. (EDS).
- First American Bankshares, Inc. in Washington, D.C., lost \$142.3 million; has outsourced to Perot Systems, Inc.
- Riggs National Corp. in Washington, D.C., lost \$57 million; has outsourced to IBM.
- Hibernia Corp. in New Orleans lost \$11 million; has outsourced to IBM.
- First Fidelity Bancorp. in Newark, N.J., lost \$6 million; has outsourced to EDS.
- Bank South NA in Atlanta lost \$4 million; has outsourced to IBM.

## No more turmoil?

Turmoil is nothing new to Bankamerica Corp.'s IS organization.

The nation's second largest bank is now led by its fourth IS chief since the mid-1980s, with the alumni club including high-profile Max Hopper at AMR Corp. and Michael Simmons at Bank of Boston. Bankamerica, based in Concord, Calif., still prefers that its executives not respond to questions about its past CIO turnover.

Compared with many of its brethren on the East Coast and elsewhere, however, Bankamerica may now have one of the most stable IS organizations. It has resolved a longtime centralized vs. decentralized debate by bifurcating IS into two "towers" supporting the retail and wholesale sides of the bank. Meanwhile, the bank has been profitable for two years.

Still, now is no time to become complacent. "There is less certainty about revenue than at any other time in the past," said Martin Stein, who left Paine Webber, Inc. to become executive vice president and head of Bankamerica Systems Engineering (Base) last year. "Cutting costs is one of the bank's six major objectives for 1991, and Base is clearly a big contributor to cost," Stein said.

The \$110 billion bank is hunting for savings in many different corners. In addition to consolidating data centers (see story bottom left), Bankamerica expects to save an estimated \$750,000 per year by "insourcing" management of its California Data Network, formerly done by AT&T. "Given our size, we can find economies of scale inside the bank," said Senior Vice President Peter Hill.

As far as high-risk tenure at the top is concerned, Stein remains confident. "What might have been a death wish three years ago is now a very viable situation," Stein said. "At Paine Webber, I had eight predecessors in five years, so I might argue my risk is diminished."

CLINTON WILDER



## NEWS SHORTS

### NEC to resell Stratus gear

NEC Corp. entered the on-line transaction processing arena last week by announcing it will resell Stratus Computer, Inc.'s new reduced instruction set computing-based system under its own label as NEC Super Tolerant FT20. Stratus' XA/R Model 20, released last month and scheduled for shipment at year's end, is the industry's first fault-tolerant machine with a dual operating system, running either AT&T's Unix System V Release 4 or VOS, Stratus' proprietary operating system.

### Slim pickings for IBM laptop buyers

IBM's new laptop computer is in tight supply. IBM claims the product, the Personal System/2 L40 SX, has been the firm's best-received personal computer ever. IBM said it has already received orders for 80% of what it expected to sell all year. But some dealers are unhappy. "I haven't seen one yet. It's ridiculous," said Matt Fitzsimmons, a Computerland Corp. dealership owner in White Plains, N.Y. A Valcom, Inc. dealership in Wichita, Kan., received only one IBM laptop out of an order for 10. "It's no more frustrating than it was waiting for the Compaq [Computer Corp.] LTE. I'm getting used to it," Valcom representative Tom Hudspeth said.

### Index/Sage merger brings charge

Intersolv, Inc., the Rockville, Md.-based software development tool firm, announced a onetime charge against earnings for the fourth quarter, ending April 30. The roughly \$20 million charge resulted from activities relating to the creation of Intersolv, which resulted from a merger of Sage Software, Inc. and Index Technology Corp. The amount included charges relating to a work force reduction of about 150 employees.

### Spectrum net manager ships

Cabletron Systems, Inc.'s artificial intelligence-based Spectrum enterprise network management system formally started shipping last week. Spectrum gives users a central graphical representation of a multivendor network from several perspectives that can be as deep and broad as the user chooses. The vendor said it hopes to sell 100 Spectrum licenses in the next 12 months and added that it has the resources to install three Spectrum sites per week. Cabletron said it added 35 support staff members for Spectrum within the last six months. The firm also announced a 72% increase over last year in worldwide sales for its fiscal year ended Feb. 28. Sales totaled \$180.5 million, while profits grew 61% to \$35.9 million.

### Pyramid adds high-end system

Nearly doubling the power of its Unix mainframe systems — to a claimed high end of 300 million instructions per second (MIPS), up from 168 MIPS — Pyramid Technology Corp. introduced its Miserver S series last week. The S series begins at \$93,000 and could top out at about \$3.5 million, according to a spokesman.

### DEC flies Delta

Digital Equipment Corp. last week announced a \$4.6 million contract with Delta Air Lines to provide systems and services for automating the production and publication of aircraft maintenance information. Delta's Technical Operations Publishing System — the first on-line maintenance information system in the airline industry — will be based on VAX/VMS systems.

### Knowledgeware fills out OS/2 line

Knowledgeware, Inc. has added two products to its line of OS/2-based computer-aided software engineering tools, seeking to pump up applications development for the struggling software platform. A rapid-application package reportedly gathers end-user business requirements during the analysis phase of development, reflects them in an operational prototype and automatically generates code. A documentation tool that integrates with the software development package keeps applications documentation up to date, the company said.

## Wang to enhance imaging connections

BY ELLIS BOOKER  
CW STAFF

LOWELL, Mass. — Seeking to increase the appeal of its imaging software to users of other computer platforms, Wang Laboratories, Inc. last week expanded its connectivity options for the IBM mainframe and Apple Computer, Inc. Macintosh worlds.

Analysts welcomed Wang's move away from proprietary imaging based solely on its own VS minicomputer architecture.

"[Wang] is exceedingly pragmatic from a market viewpoint," said Mike Howard, program director of office information systems at Gartner Group, Inc. in Stamford, Conn. The company, he said, has "looked itself in the mirror" and realized it has to be a solutions provider using the hardware and software of others when necessary.

The mainframe software, Open/Image IMS/DC, allows applications running on IBM and compatible hosts to control Wang image processing, either on a Wang image server or a local-area network server.

The LAN product, Open/Image 3270 Windows, works on IBM's Systems Network Architecture networks and allows mainframe applications to access

Wang imaging services on a personal computer network. The network image servers can run on standard PC LAN operating systems from Banyan Systems, Inc., Novell, Inc. and 3Com Corp.

Open/Image 3270 Windows works with both the newly introduced IMS/DC product and Open/Image CICS. Wang previously introduced the latter, which integrates Wang imaging services with IBM CICS applications.

Open/Image IMS/DC and Open/Image 3270 Windows are both scheduled to be available in June. The IMS/DC product will be priced at \$25,000, and the PC LAN offering, configured with 20 users, an image server, an optical jukebox and LAN and imaging software, will cost \$320,580 (\$16,029 per client), according to Wang. Wang also vowed to bring forth support for other mainframe operating systems — specifically, MVS/ESA and DOS/VSE — but did not give a timetable.

For Macintosh users, Wang announced Macvs Image workstation software, which enables either stand-alone or networked

Macintoshes to connect with Wang VS image servers. Users can also mix Macintoshes and IBM Personal Computer AT-compatible systems over a network with the new software, which is scheduled to be available in May, Wang said.

Wang is offering two pieces of workstation software for the Macintosh. One, priced at \$350 per client, allows Macintosh clients to access VS data applications. Another, at \$1,500 per client, gives Macintoshes

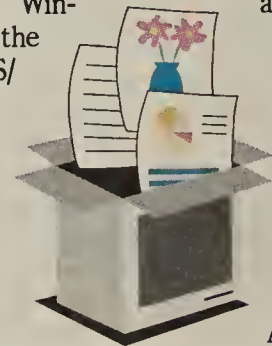
access to integrated data and image applications on the VS. Users will also need \$750-per-server

Macvs 802.3 LAN software to link Macintoshes and VS hosts. The LAN software provides native Appletalk capabilities to

VS servers, and Macintoshes can be connected directly via an Ethernet option board or over a LocalTalk network, which is connected to the LAN and server over a router.

Not unexpectedly, Wang said the next release of its PC software, due in June, would support Microsoft Corp.'s Windows 3.0.

Moving up to Windows 3.0 is of interest to Nick Gismondi, manager of uniform systems at U.S. Steel Corp. in Pittsburgh. But Gismondi says he believes the Windows 3.0 version will execute faster than his current Wang WIIS Windows system, which has a response time of about two seconds.



## NCR bids

FROM PAGE 1

other magnetic and optical media.

NCR is clearly hoping to garner a piece of an exploding market. North American revenue from imaging systems grew from \$172 million in 1988 to \$911 million in 1990, according to BIS Strategic Decisions, a research firm in Norwell, Mass. That figure could climb to \$12.6 billion by 1995, BIS said.

Potential customers examining the NCR offering last week were particularly interested in how well DMS would fit into their existing systems.

Ray Tamayo, senior vice president at Republic National Bank in New York, said he was at the NCR announcement because "we're looking at putting in an imaging pilot in the third quarter. We've not narrowed it down to a vendor yet." He said his "main question" was how well DMS integrates into his company's computing environment, which includes Digital Equipment Corp. and IBM computers.

Barbara Rigsby, manager of office automation at Westinghouse Corp.'s commercial division in Baltimore, said her com-

pany is also looking to install an imaging system. Although Westinghouse has not yet selected a vendor, Rigsby said one allure of the NCR system is that it is based on "open standards."

DMS includes scanners, high-resolution displays, servers, workstations, optical storage devices and laser printers. Prices range from approximately \$800,000 for a 20-workstation system to \$3.5 million for a 120-workstation system. In addition, NCR will sell the software components separately so users can image-enable their existing workstations and servers.

NCR's System 3000 Unix computers act as servers in the imaging network, with MS-DOS personal computers as the front end. Clients and servers are connected via Ethernet or Token Ring local-area networks.

### Looking to Windows

Other features include terminal emulation to IBM mainframes and DEC computers as well as a data-compression scheme that allows imaging information to take up less bandwidth than would otherwise be required. NCR is also providing applications development tools based on Microsoft Corp.'s Windows.

The system is scheduled for

general availability in October. Manufacturers Hanover Trust Co. in New York has ordered DMS and will install it later this year, NCR executives said.

In the meantime, analysts said they are impressed with DMS. "NCR has gone a long way toward solving some of the nitty-gritty problems of imaging," said Thomas Nolle, president of CIMI Corp., a technology assessment consulting firm in Voorhees, N.J.

"They've paid particular attention to how you substitute electronic distribution for manual routing of documents. It's the greatest strength of the system," he added.

Nolle also said that, unlike imaging systems from Unisys Corp. and other players, NCR's system is based on a single architecture. "It's enough of a challenge to bring imaging into an organization without having to worry about integrating the imaging systems as well."

Bruce Silver, director of image management systems at BIS, said, "I'm favorably impressed that they've done a number of things right." In particular, he said, NCR's implementation of character recognition sets the system apart from others on the market.



# Comten users not worried

Say AT&T buyout might even strengthen NCR's communications unit

BY GARY H. ANTHERS  
CW STAFF

BALTIMORE — Users of NCR Corp.'s Comten networking products seem resigned to soon becoming customers of AT&T, most saying the controversial buyout would either strengthen Comten or have no effect on it.

But a few users attending the Comten Users' Exchange here last week worried that AT&T might spin off or sell the communications products unit, leaving product maintenance and enhancement in question.

"Most users see it as a done deal," said Ronald Block, president of the user group and a vice president at New York-based Donovan Data Systems, Inc. "And they view it positively. AT&T is a huge organization and a big user of Comten equipment. They know the children."

One Comten user at the U.S. Department of Health and Human Services said NCR's absorption by AT&T would make no difference to the agency, but a colleague disagreed. "The financial backing and the networking expertise of AT&T will help Comten. Both companies will benefit," he said.

John Ostrowski, a program-

mer at the Internal Revenue Service's Martinsburg, W. Va., computer center, said he was "not too worried." He said the IRS is moving toward open systems as part of its massive computer systems modernization, and that will offer alternatives to the proprietary Comten Systems Network Architecture (SNA) equipment now in use by the agency.

## Fear of sale

An official at the National Aeronautics and Space Administration, which has much Comten gear, was troubled by the possibility that AT&T might sell NCR's Comten unit or just let it atrophy. "I don't see how Comten fits into AT&T's Unix strategy," he said.

Neither AT&T nor NCR would comment directly on Comten's future under an AT&T umbrella. "Until we've been able to sit down with NCR management and work out a transition plan, it's pure speculation," an AT&T spokesman said.

However, he pointed to a Dec. 2 letter in which AT&T Chairman Robert E. Allen told NCR Chairman and Chief Executive Officer Charles E. Exley Jr. that Allen intended to put

AT&T's computer business and NCR's businesses under NCR management. Allen also pledged to "maintain uninterrupted relationships with NCR employees, customers and suppliers," and he said, "it is not our intention that any NCR facilities will be closed."

Last year, NCR's Comten unit sold \$113 million in communications processors and other software and hardware for SNA, Transmission Control Protocol/Internet Protocol and Open Systems Interconnect networks. Comten was bought by NCR in 1979 but was operated at arm's length until recently. In January, the sales and customer service groups of NCR and Comten were combined.

Frank Dzubeck, president of Washington, D.C.-based Communications Network Architects, Inc., said one faction at AT&T favors holding on to Comten while another wants to get rid of it after the buyout is completed. But he said now that Comten and NCR have become more closely integrated, selling Comten would not be easy. He predicted AT&T would retain the Comten product line and that Comten users will be affected "not one iota" by the merger.

# Allen: We need NCR but won't pay \$110 a share

BY MICHAEL FITZGERALD  
CW STAFF

CHICAGO — Calling himself "a very patient person," Robert E. Allen, chairman of AT&T, said last week that netting NCR Corp. was essential to AT&T's future growth. However, he told reporters that AT&T would not pay the \$110-per-share, or \$7.4 billion, asking price set by Charles E. Exley Jr., NCR's chairman and chief executive officer.

Allen's patience may be paying off. Exley prepared to remove the word "chairman" from his business card, after preliminary results of the shareholders' vote from NCR's annual meeting showed that he and three other NCR board members, including NCR President Gilbert Williamson, had been voted off the board. A special vote to oust the entire board fell far short, with only 52% of the needed 80% voting for it. The results are expected to be certified sometime this week.

The flat statement that AT&T will not up its bid for NCR — AT&T has offered as much as \$100 per share for a friendly merger — did little to cool

NCR's rocketing stock price. Analysts said arbitrageurs are betting that a rise in AT&T stock, now trading at more than \$38 per share, will allow the company to renew a virtual three-for-one stock swap deal it had offered months before when AT&T stock traded near 30.

The record high hit by the Dow Jones Industrial Average last week "increases the odds we will see more money for NCR," said Charles Neuhauser, an analyst at Legg Mason Wood Walker, Inc. in Baltimore. "AT&T stock is up to the extent it should make it more palatable for them to offer a higher dollar value."

Allen made his remarks at AT&T's annual meeting, where the company announced a 6.6% increase in first-quarter profits — \$712 million on \$9.19 billion in sales, up from \$668 million on \$8.9 billion in sales one year ago.

Earlier in the week, NCR announced better than expected results for the first quarter. NCR had record revenue of \$1.37 billion, although profits slipped to \$46 million. NCR claimed that profits would have risen 4% if it were not for costs related to fighting AT&T's takeover attempt.

# AT&T laptop turns heads, but it's a jungle out there

## ANALYSIS

BY MICHAEL FITZGERALD  
CW STAFF

NEW YORK — Today's laptop computer announcement from Safari Systems, the joint venture between AT&T Computer Systems Division and Marubeni America Corp., will turn heads, if not open corporate wallets.

The Safari laptop, based on Intel Corp.'s 80386SX chip, is distinctively styled. AT&T and Henry Dreyfuss Associates, a design firm based here, developed a black matte case with a gray ridged "bumper" around the outside seam and a similarly styled handle. Attendees at last week's Laptop-Palmtop Expo

'91 here crowded around a Safari and generally seemed impressed with its design and features. However, they were a little put off by its \$5,399 price tag.

"What differentiates it is its software and its connectivity features," said Tim Bjarin, executive vice president at Creative Strategies International, Inc. in Santa Clara, Calif.

The most distinctive features are communications-oriented. AT&T has included a 2,400 bit/sec. internal fax/modem and a beta-test version of AT&T Mail Access Plus 2.2, a front-end to AT&T's Easy Link; the company said registered buyers will receive the finished version at a later date. Wireless messaging is possible with an option called the

Wireless Mailbox, and in the third quarter, a 9.6K bit/sec. internal fax/modem will be available. Another option will include a local-area network adapter from Xircom, Inc.

At 9½ by 12 by 1½ inches, the machine fits in a briefcase, and its full-size, 82-key keyboard has a better feel than many of its counterparts, although it is somewhat spongy. The 10-in., IBM Video Graphics Array-compatible super-twisted display features electroluminescent backlighting.

Safari weighs 7 pounds, 2 ounces, or 7 pounds, 5 ounces with the handle. It has two built-in RJ11 phone jacks and two cables — one to hook to a phone and one to hook to a wall jack.

It also features a system window, visible with the laptop closed or open, that uses icons to

crosoft Corp.'s DOS 4.01 EMM 386.sys applications behave improperly if full power management is on.

What remains to be seen is whether distinctive styling and

## On Safari

AT&T's laptop has a bundle of features — and a premium price

► **Processor:** Intel Corp. 20-MHz 80386SX

**Size:** 9.5 by 12 by 1.5 in.

**Weight:** 7 pounds, 2 ounces without handle

**Display:** 10-in., Video Graphics Array-compatible backlit, super-twisted screen

**Memory/Storage:** 2M bytes of RAM, expandable to 6M bytes; 40M-byte hard disk, upgradable to 80M bytes

**Communication:** internal 2,400 bit/sec. fax/modem

**Bundled software:** Microsoft Corp.'s Windows 3.0, AT&T MS-DOS 4.01 Revision 1.1, Microsoft's Productivity Package, Safari Systems Tourguide and Safari Utilities (modem diagnostics, temporary reconfiguration of system and password keyboard)

**Price:** \$5,399

display the power source, indicate if batteries are low or whether automatic power management is in use and more.

When used with all its power management features, Safari's double nickel-cadmium batteries provide between four and six hours of battery life. Safari can be used with a single battery, and a third battery can be added, extending life to as long as nine hours. However, AT&T warns that Borland International, Inc.'s Paradox Version 3.5 database, Quarterdeck Office Systems, Inc.'s Desqview 386 Version 2.3 with QEMM Version 5.1 and Mi-

better-than-average SX notebook features can overcome a relatively high price tag, AT&T's weak reputation in the personal computer field and the ferocious competition in the SX notebook PC market. But at least one analyst predicts Safari will survive.

Matsushita Electric Industries Co. will manufacture the Safari products, which began shipping last week, at its plant in Franklin Park, Ill. Resellers include Microage, Inc., Sears Business Centers, Computer Bay, Claretch Business Centers, Inc. and Arrow Electronics, Inc.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

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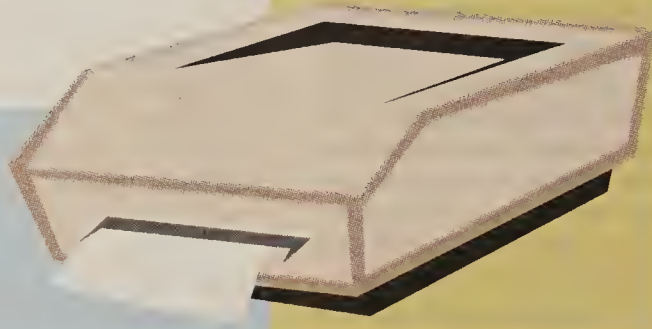
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## TRENDS



## Image Management Systems



The imaging market continues to gain momentum as many early adopters move from pilot systems to full production systems

An early adopter, financial services continues to lead in both revenue and system placements

## System placements by industry

(North American sites)	1990	1991*	1992*	1993*
Services	280	376	908	1,666
Financial	352	450	1,029	1,790
Manufacturing	306	395	912	1,602
Government	338	437	1,004	1,760
Health	81	104	241	423

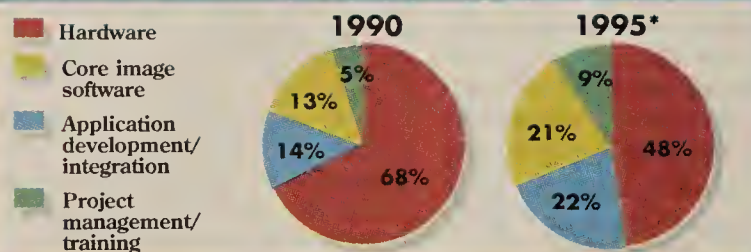
## Revenue by system size

(In millions)	1990	1991*	1992*	1993*
Sub-work group	\$57	\$72	\$165	\$290
Work group	\$229	\$287	\$602	\$1,013
Departmental	\$375	\$469	\$972	\$1,618
Multidepartmental	\$198	\$315	\$589	\$1,079
Enterprise	\$52	\$77	\$121	\$188

Revenue figures include hardware, software and service revenue for new system placements; sales of add-on equipment; and support and maintenance costs

Sub-work-group and work-group systems dominate the market in units, but systems serving a single department with 15 to 70 workstations lead in revenue

## Percent of total revenue for new systems purchased



Over the next five years, software is expected to represent an increasing percentage of the total revenue for new systems purchased

\*Projected

Source: BIS Strategic Decisions, Norwell, Mass.

CW Chart: Donald Maurer

## N E X T W E E K

**Quality software:** What you get after spending millions of dollars fixing bugs. A joke? Not to those firms for whom this definition is all too real. But firms can develop quality software with an improvement plan that targets key IS areas — measurement, development, the maintenance organization and more. See In Depth.



Jamie Hogan

**E**xclusive *Computerworld*/Andersen Consulting survey examines executive attitudes toward information technology. Two years ago, many CEOs and other corporate officers were swooning over the idea of using IS for competitive advantage. Today, hard experience and cold reality have moderated executive hopes about IS. See Executive Report.

## INSIDE LINES

## Jim Manzi's Excel-ent adventure

Lotus' 1-2-3 for Microsoft's Windows went into beta testing last week with an initial rollout to about 20 of Lotus' top customers. By summer, Lotus chief Jim Manzi expects to have shipped from 1,000 to 2,000 beta-test copies. Manzi refused to talk specifics but did say customers love the backwards compatibility built into 1-2-3/W. He also hinted at a tighter "fit and finish" with other Lotus Windows-based products.

## Did Dick Tracy beta-test this?

The Hewlett-Packard/Lotus palmtop will be introduced this week, along with new pager technology from Motorola that will reportedly allow HP palmtop users to receive text messages and incorporate them into applications virtually anywhere they happen to be.

## Turnaround channel

A triumphant Gary Held, chief executive officer of Northgate Computer Systems, is expected to announce today that Northgate had a profit of \$2.24 million on \$46.94 million in sales in the first quarter of 1991. Held calls the last three months a turnaround case study made for Harvard Business School. Skeptics eyeing the brewing storm clouds of PC price pressures might point out that Harvard prefers businesses to do well for an entire year.

## Vines outgrowth

Banyan Systems Vines users who are disappointed that the network does not yet support Apple Macintosh clients can take heart. One Vines customer at the recent user conference in Montreal said he had volunteered to be a Macintosh client beta-test site in six months, but Banyan had replied it would be ready for beta testing much sooner than that.

## Looking for your Achilles' heel

Among the latest confidence scams traveling around the Internet is a Trojan horse in the form of a game and mail message that asks the recipient to beta-test the game and provide the developer with feedback. The game includes a program designed to sneakily capture logons and passwords. In another scam, a message supposedly from the systems administrator asks users to temporarily change their passwords to a common password as part of a security check. In the interim, a hacker enters their accounts and sets up trapdoors that allow him to freely return later.

## A chicken-and-egg classic

A dedicated band of users and vendors, including DEC, IBM and the U.S. Department of Defense Internet folks, are doggedly trying to come up with an application programming interface (API) for TCP/IP. The protocol was originally designed "as an interoperability tool, not a program development tool," so it lacks the equivalent of Open Systems Interconnect Layer 5 or a standardized application interface, industry analyst Frank Dzubeck says. With TCP/IP's recent apotheosis into a de facto networking standard, however, vendors want that API so they can fill the demand for TCP/IP-based applications.

## See you in the fall, maybe

Appearances — live and taped — by top-level IBM executives John Akers and Jack Kuehler last week are proof that concern over OS/2 has reached the highest echelons in the company. One unconfirmed story had Akers taking the name badges from IBM desktop software executives, telling them they will get them back once OS/2 Version 2.0 ships.

## Into the chips

Among a gaggle of vendors ready to trot out systems based on Intel's i486SX — expected to be announced today — are AST and Advanced Logic Research.

One humorous line passed on to us last week had Sun's Scott McNealey responding to a query on how he measures his worth with the response "Milligates," an apparent reference to a recent report that Mr. Bill is worth \$4 billion. Your best lines should be directed to News Editor Pete Bartolik at (800) 343-6474, faxed to (508) 875-8931 or lodged on Compuserve 76537,2413.



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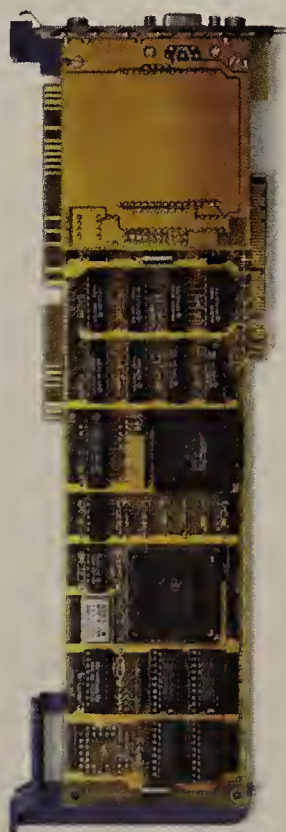
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